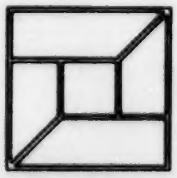
REGIONAL UTILITIES SYSTEM INVENTORY



Technical Background Report

REGIONAL PLAN PROJECT

Edmonton Metropolitan Regional Planning Commission

REGIONAL UTILITIES SYSTEM INVENTORY

(Water supply, sanitary sewage and solid waste disposal)

Technical Background Report
REGIONAL PLAN PROJECT
Regional Planning and Research
Edmonton Metropolitan Regional Planning Commission

UPDATED November 1983

EDMONTON METROPOLITAN REGIONAL PLANNING COMMISSION

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OUR FILE .....

YOUR FILE .....

February 23, 1984

Mr. R. Quinn, Chairman
and Members of the
Edmonton Metropolitan Regional Planning Commission

Dear Members:

It is my pleasure to submit to the Commission this research report entitled "Regional Utilities System Inventory". This report is one of a series of technical background studies leading to the preparation of the regional plan. It also provides municipalities and government agencies with an overview of the region's utility systems; enabling them to better relate their own programs to those of the metropolitan region.

This report provides inventory of major water, sewer and solid waste facilities in the region including recent proposals for extension to these systems. The report also identifies key issues related to regional servicing and reviews the administrative arrangement and Provincial programs for delivery of municipal utility services.

This report was prepared by the Regional Planning and Research Division, then initially reviewed by the Regional Plan Committee in June 1982, where it was discussed and approved with suggestions for change. Since then the report has been updated and expanded due to new information and subsequently reviewed by the Committee at its meetings of December, 1983 and January, 1984. At the January meeting the Committee agreed to send the report, as amended, to the Commission with the recommendation that it be published.

The report is now before the Commission to be received as information and to be approved for publication and distribution.

Those requiring additional information concerning this report are encouraged to contact the Edmonton Metropolitan Regional Planning Commission staff and/or the departments referred to in this document.

Yours truly,

R.N. Giffen
Executive Director

ELD/ig
Attachment

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ACKNOWLEDGEMENTS

This document evolved as a result of contributions of a number of individuals and government departments. Special mention is made of the contribution of the Commission's Regional Plan Committee who reviewed earlier drafts and provided suggestions for improvement to this document. A list of the project team and other major contributors follows.

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Valuable comments, suggestions and information have been provided by other members of the Commission staff, and staffs of a number of municipalities and Provincial departments. Special thanks to the following: Don Sutherland, Municipal Engineering Branch, Alberta Environment; John Slupsky, Waste Management Branch, Alberta Environment; Mike Brooks with Edmonton Water and Sanitation Department; Dave Shillabeer, Municipal Utilities Division with Alberta Utilities and Telecommunications.

1. INTRODUCTION

This report has been prepared as one in a series of background reports required for the regional plan preparation. The report inventories servicing systems for water, sewer and solid waste facilities. Key issue areas related to servicing and municipal systems operations are examined in some detail.

This report consolidates information from various recent municipal servicing studies on water, sewer and/or solid waste disposal systems operating within the Region. Recently published material by Mr. G. Hamilton, a consultant to Alberta Municipal Affairs on the Regional Services Commission, has been incorporated into this document, along with earlier E.M.R.P.C. discussion papers on regional utilities.

This report is intended to update the E.M.R.P.C. records respecting:

(1) the types and capacities of the various municipal and regional water and sewer systems in operation;

(2) location and status of various municipal solid waste disposal sites;

(3) the administrative arrangements involved in regional servicing for water and sewer systems;

(4) the proposed structure and operation of the Edmonton Regional Municipal Services Commission;

(5) existing provincial programs affecting utility services;

(6) significant regional concerns relating to the delivery of regional utilities.

This report does not attempt to discuss the economic impact of regional servicing arrangements nor speculate on likely timing and implementation of the Edmonton Regional Municipal Servicing Commission. These two topic areas are outside the scope of a regional utilities system update. In addition, this report does not review stormwater management facilities since these facilities are primarily a local servicing concern and rarely involve inter-municipal servicing arrangements.

The Edmonton Regional Utilities Study 1978, used the term "regional" to describe a number of municipal districts, counties, hamlets, villages, towns and cities within a broad and irregular district surrounding a central city. Each by reason of geography, topography or geology either has or is perceived to potentially have an interest in inter-municipal co-ordination of utilities. The study was based on the premise that economical and environmental savings could be obtained by utilizing facilities common to more than one municipality. The word "regional" as applied in any discussion on municipal utilities in the following text refers only to those municipalities which are presently involved in inter-municipal servicing arrangements for water supply, sanitary

sewage treatment, stormwater control and solid waste management or any of these. In the E.M.R.P.C. planning region, the City of Edmonton is the dominant community in the metropolitan area providing neighbouring municipalities utility services through agreements.

1.1 Report Content

The report is divided into seven sections:

Section 1 - Introduction

Section 2 - Water Supply, Transmission and Distribution

Information on Edmonton's internal system; direct supply to municipalities; independent systems; discussions on inter-municipal trunklines and treatment systems; and water board arrangements.

Section 3 - Sanitary Sewage Collection, Transmission and Treatment

Information on City of Edmonton and St. Albert facilities; independent municipal systems; discussions on inter-municipal trunklines and treatment systems and sewage board arrangements.

Section 4 - Solid Waste Disposal

Data on various disposal sites; City of Edmonton's, inter-municipal regional sites and independent municipal disposal sites.

Section 5 - Financial Assistance Programs

Review of current provincial servicing programs available to municipalities.

Section 6 - Edmonton Regional Municipal Services Commission

Review of Act; proposed organization and functions of the Regional Services Commission.

Section 7 - Regional Planning Issues

Issues arising from the report, findings to date and implications for regional plan policy.

2. WATER SUPPLY, TRANSMISSION AND DISTRIBUTION

2.1 Introduction

The major source of water for the metropolitan region is the North Saskatchewan River. The municipalities which rely on this river can generally provide an adequate quantity of good water for their residents. However, as reported by Alberta Environment in the Edmonton Regional Utility Study 1978, (E.R.U.S.) many of those communities remote from the river, or not connected to the City of Edmonton System, experience shortages and use water which is often of a quality below recommended standards.

The City of Edmonton, because of its size, location, capital investments, installed facilities and scale of its operations in the treatment of water, plays a dominant role in supplying many communities surrounding the City. The present operation of drawing water from the North Saskatchewan River, treating it in expanded central plants, and then transmitting it through water mains in the City and through transmission mains serving the surrounding region, will continue in the future. The City of Edmonton wholesales water either directly to municipalities or to Regional Water Boards.

Although the majority of communities in the metropolitan region receive treated water from Edmonton, there are a few independent systems in operation. The communities of Devon, Bon Accord, Legal and New Sarepta have their own water supply and treatment operations. These operations have developed as a result of existing available water supplies, geographic distance from central water plants, and/or due to diseconomies of scale for smaller sized communities.

The following section of the report reviews the various administrative arrangements for the treatment and delivery of municipal water, starting with the largest system, the City of Edmonton internal system. A discussion on the City of Edmonton's direct supply to municipalities or water boards is followed by a discussion on independent municipal operations.

The review of each municipal operation includes: an inventory of existing facilities (water supply source and treatment facilities), current capacity, regional transmission design populations (if applicable) and an evaluation of the system's capacity to accommodate additional population growth.

2.2 Edmonton's Internal System

The City of Edmonton has two water treatment plants in operation: Rossdale and E.L. Smith. These two major plants supply treated water to the City of Edmonton as well as many regional communities. In 1982, 688,077 persons were supplied, 12 percent of whom were regional customers.

As reported in the City's Local Policy Plan (1983 to 1988) several additions are planned to the E.L. Smith water treatment plant. Stage 2 is planned for completion in 1984, Stage 3 conceptual designs have been initiated and construction of the project is scheduled to begin in 1984 and culminate in a start-up of the facility in 1986. The Stage 3 expansion, which will double the plant's net capacity to 340 million litres per day, includes improvements to the raw water supply system and design and construction of four large flocculation/settling tank units. The proposed Stage 4 expansion would eventually increase capacity to 540 million litres per day.

Complete refurbishment of the Rossdale water treatment plant is planned over the next 5 years to meet present day standards. The plant has a 1983 installed capacity of 200 million litres per day. Projected maximum reliable treatment capacity for 1992 will be 290 million litres per day. A major problem with the Rossdale facility is the lack of space to expand facilities.

Under the current capital works program (1983-88) several reservoir modifications and additions are proposed as well as the installation of new transmission mains. Projects include the Papachase, Ormsby, Thorncliff, Castledowns and Clareview reservoirs as well as upgrading of the pumphouse and pumping capacity at Clover Bar reservoir.

The City of Edmonton has no absolute population capacity limits since its systems are being continuously upgraded. The only limitation is the capacity of the North Saskatchewan River to provide raw water supply.

The existing City system is highlighted as follows:

SUPPLY SOURCE	TREATMENT	CURRENT CAPACITY	1983 POPULATION	REMARKS
North Saskatchewan River	Complete treatment at E.L. Smith and Rossdale plants	expandable plants, continual upgrading	560,085	The 1982 figure for persons supplied is 688,077. This includes regional community requirements.

2.3 Edmonton's Direct Supply to Municipalities

Historically, initiatives for the planning, implementation and operation of the regional water supply systems came from the municipalities adjoining the City of Edmonton. The City of Edmonton agreed to provide treated water under a contract which gave servicing priorities (pressure and flow) to Edmonton consumers. This system provides an adequate return on investment (full recovery of costs) and limits the need for capital investment, as the municipalities are required to pay the capital costs of the mains needed to bring water to designated connection points. Standby emergency facilities, storage systems and main sub-regional transmission facilities have been developed by the regional communities in cooperation with the Province.

Presently the City of St. Albert, the Town of Morinville and Sherwood Park purchase treated water directly from the City of Edmonton, in addition to operating and maintaining their own municipal transmission systems. In addition the City of Edmonton wholesales treated water to three regional water boards: Parkland, Northeast, and Strathcona-Leduc.

(1) City of St. Albert

The City of St. Albert owns and operates its own water storage and distribution system, but presently purchases treated water from the City of Edmonton. A major water line 450 mm diameter main from Edmonton was completed in 1981, which delivers water from the E.L. Smith plant. The 450 mm main is fed from a City of Edmonton 1,050 mm diameter main. This supply line has a maximum flow of 190 litres per second. This line has been sized to supply St. Albert, Morinville, Legal and the Castledown neighbourhood area of Edmonton in the future.

St. Albert has a water supply agreement with Edmonton which expires in 1994. The 1982 recorded supply of delivered raw water (annual daily average [A.D.A.] supply values) was 9.85 million litres per day and the requested supply for 1983 is 10.79 million litres per day.

The existing St. Albert system is highlighted as follows:

SUPPLY SOURCE	TREATMENT	CURRENT CAPACITY (pop.)	1983 POPULATION	REMARKS
Edmonton Plants	E.L. Smith Plant	90,000	35,032	The City of St. Albert has a high capacity for growth based on water supply.

(2) Town of Morinville

Treated water is purchased from the City of Edmonton. The Town has constructed a new treated water reservoir, a pumphouse and a 550 mm supply line from Morinville to Edmonton (via St. Albert system). This new system has been linked with the existing municipal treated water reservoir and pumphouse. The 1982 recorded supply of delivered raw water (annual daily average supply values) was 1.43 million litres per day from the City of Edmonton and the requested supply for 1983 is 1.98 million litres per day. The recorded water supply used by the Town of Morinville in 1983 was 1.4 million litres per day with an expected demand for 1.6 million litres in 1984.

The existing system is highlighted as follows:

SUPPLY SOURCE	TREATMENT	CURRENT CAPACITY (pop.)	1983 POPULATION	REMARKS
Edmonton Plants	Edmonton Plants	30,000	5,109	The Town has a high capacity for growth based on water supply.

(3) Hamlet of Sherwood Park

Sherwood Park servicing is arranged by the County of Strathcona and the City of Edmonton and no intervening water board is presently involved in those arrangements.

The existing water supply consists of five reservoirs and a transmission network located throughout the existing residential and industrial developments. The total capacity of the existing transmission lines is approximately 30 m.i.g.d which will adequately transmit water to service a population of 70,000 in addition to ±10,366 acres of general restricted and heavy industrial lands.

The effective capacity, however, is limited by the supply capacity from the City of Edmonton's Rossdale Water Treatment Plant and will not be able to support long range demands. A long term proposal by the City of Edmonton (10-20 years time frame) to construct a large diameter ring main from the E.L. Smith Plant along the southern leg of the R.D.A. The timing of construction of this main will depend on growth in the City of Edmonton's southeast annexation area. This future facility would have additional capacity to supply Sherwood Park's future requirements.

The existing system is highlighted as follows:

SUPPLY SOURCE	TREATMENT	CURRENT CAPACITY (pop.)	1983 POPULATION	REMARKS
Edmonton Plants	Edmonton Plants	70,000	28,798	A program of continual upgrading of facilities is undertaken. Estimated transmission line design population of 78,000 can be served.

2.4 Edmonton's Direct Supply to Water Boards

Operating within the E.M.R.P.C. region are three working associations of municipalities that have formed outside of a formal legal structure. The three working groups of municipalities (or commonly called Water Boards) in cooperation with Alberta Environment help to coordinate the service and delivery of treated water from the City of Edmonton treatment plants to the participating membership.

The Water Boards act as administrative and technical agents working on behalf of their municipalities. The Water Boards membership is as follows:

(1) Strathcona-Leduc Water Board

Consists of the City of Leduc, County of Leduc, Town of Calmar, the International Airport, and Town of Beaumont. The County of Strathcona is a member of the Board, but because of the recent Edmonton annexation no County residents are supplied by this system.

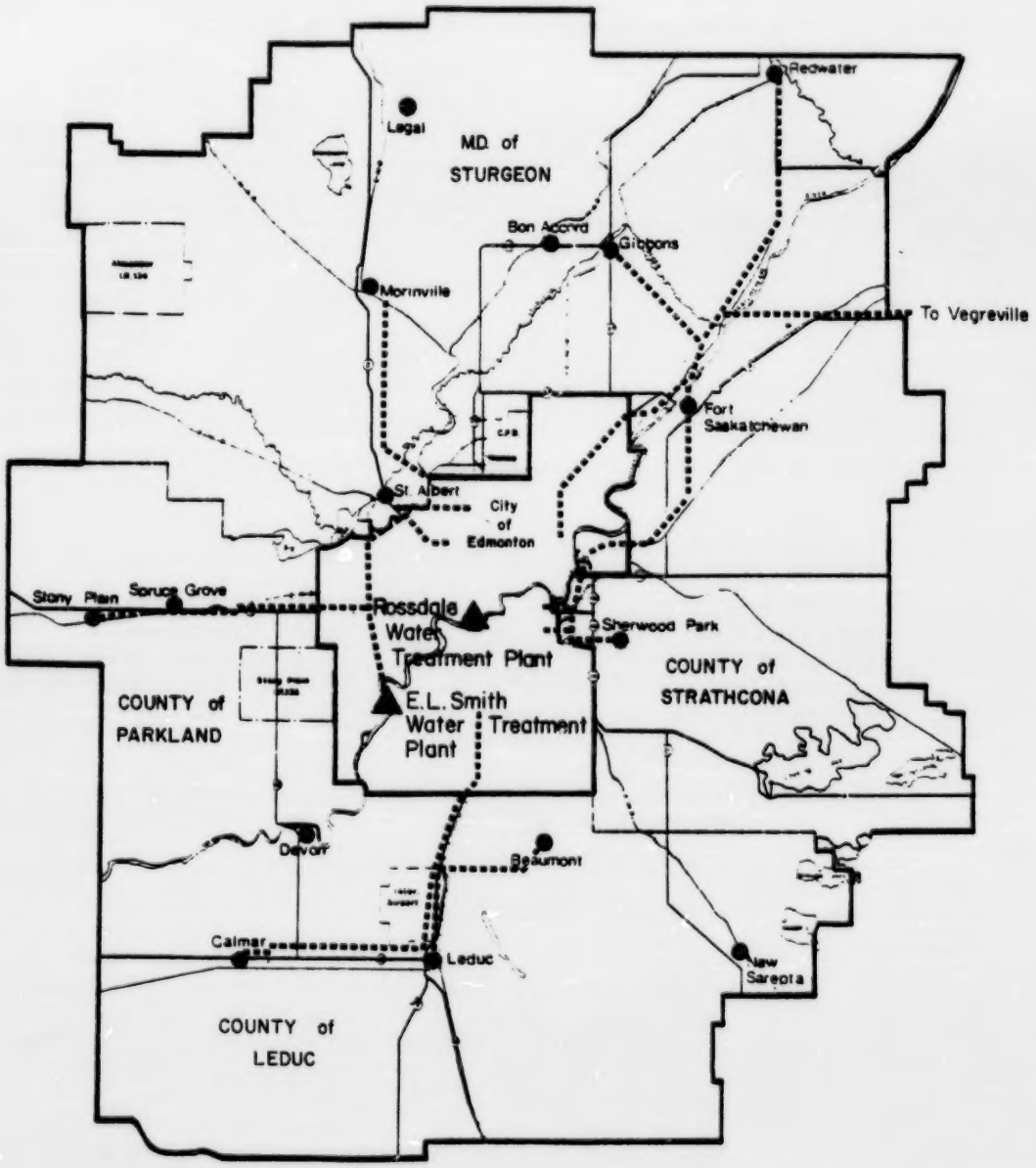
(2) Northeast Water Board

Consists of Town of Fort Saskatchewan, Town of Redwater, the M.D. of Sturgeon, and portions of the County of Strathcona.

(3) Parkland Water Board

Consists of the Town of Spruce Grove, Town of Stony Plain and the County of Parkland.

REGIONAL UTILITIES SYSTEM INVENTORY



INTERMUNICIPAL WATER TRANSMISSION LINES AND TREATMENT PLANTS

LEGEND

Source: ALBERTA ENVIRONMENT

..... Existing Trunk Line

▲ Treatment Plant

N

Edmonton Metropolitan
Regional Planning Commission

November, 1983

FIG. 1

Major water transmission lines have been constructed to service the majority of communities in the Edmonton Metropolitan Region. The specific locations of the inter-municipal water transmission lines and treatment facilities are identified on Figure 1. The following service trunklines have been completed.

(1) The Strathcona-Leduc link is in place.

(2) The two lines from Edmonton to Fort Saskatchewan are complete.

(3) The Fort Saskatchewan to Gibbons and Redwater line is complete. Phase three of the Fort Saskatchewan to Gibbons is almost complete.

(4) The first phase of the 1050 mm service line has been constructed for St. Albert and Town of Morinville. This line has been oversized to serve Legal and part of the M.D. of Sturgeon.

(5) Edmonton-Stony Plain line are complete. This line has been oversized to serve the Spruce Grove, Stony Plain and part of the County of Parkland.

NOTE: Another water user connected to Edmonton's water treatment plants but outside this planning region is the Vegreville Corridor Water Board. The trunkline to Vegreville is essentially in place which will service the communities of Bruderheim, Lamont, Chipman, Mundare and Vegreville.

Plans regarding a proposal to build a new regional water treatment plant up stream from Edmonton for additional regional supply remain uncertain.

A summary of the regional water transmission system and requested regional water supply for 1983 follows in Tables 1 and 2. The participating municipalities' current capacity and design populations are also highlighted.

TABLE 1

INTER-MUNICIPAL WATER TRANSMISSION LINE DESIGN CAPACITIES
(For Participating Urban Municipalities Only)

Water Board	Municipalities	Current Capacity (pop.)	Transmission Line Design Population	1983 Population
STRATHCONA-LEDUC	Beaumont	12,000	11,500	3,202
	Calmar	8,000	8,000	1,118
	Leduc	40,000	40,000	13,000
NORTHEAST	Fort Saskatchewan	40,000	50,000	12,474
	Redwater	8,000	8,000	2,187
PARKLAND	Spruce Grove	40,000	40,000	11,307
	Stony Plain	20,000	20,000	5,291

Note: Design capacity figures for rural municipalities receiving service from inter-municipal transmission lines is not available.

TABLE 2

REQUESTED INTER-MUNICIPAL SUPPLY FOR 1983
(Annual Daily Average Supply Values)

	1982 Recorded Supply	1983 Requested Supply
Strathcona-Leduc Water Board	6.26 ML/D	6.32 ML/D
County of Strathcona (including N.E. Water Board - South Line	23.00 ML/D	23.90 ML/D
N.E. Water Board - North Line	4.75 ML/D	9.15 ML/D
Parkland Water Board	5.59 ML/D	6.48 ML/D

Source: City of Edmonton, Water and Sanitation Department.

2.5 Independent Systems

The communities of Devon, Bon Accord, Legal and New Sarepta provide their own water supply and treatment facilities. All of these municipalities have servicing capacity to serve their needs for at least the next 10 years.

These independent systems include the following:

(1) the collection and storage of raw water;

(2) treatment, if necessary;

(3) transportation by gravity and/or pumping;

(4) storage of treated water within reservoirs;

(5) piped distribution and sales to final consumers.

Bon Accord obtains water from wells and uses chlorination as a primary treatment method. The system has a design capacity of 3,500. The Town has sufficient service capacity to accommodate additional growth.

Devon obtains water from the North Saskatchewan River and operates its own water treatment plant. Present design capacity is for 6,000 persons and the supply system can be expanded to meet future demands.

Legal's system is dependent on the catchment of surface water in an impounding reservoir. The construction of the Manawan canal increased the system capacity from 2,000 to 4,000 persons, adequate to serve future requirements. Alberta Environment officials indicate that possible future connection with the regional transmission line is being considered. A future design capacity of 6,000 persons for the year 2005 has been estimated.

New Sarepta is currently served by deep wells. The 1981 capital works projects installed deep water lines, a reservoir and provided iron removal treatment. The system is estimated to have a current capacity to serve a population of 1,000.

Gibbons can be considered as independent municipality not belonging to a water board but rather being a customer of the Northeast Water Board. The community is serviced via trunkline from Edmonton via Fort Saskatchewan. The Town has a current service capacity of 10,500 persons and a long term service design capacity of 30,000 if all pumping facilities are installed.

2.6 Summary

Table 3 provides a summary sheet on municipal water systems and helps to identify the growth potential of municipalities based on water capacities. All communities have a medium to high capacity range to accommodate additional growth. The inter-municipal water transmission lines provides a high quantity and level of service for many communities. Municipalities with independent systems, like Bon Accord, Devon, Legal and New Sarepta, operate satisfactory systems within Alberta Environment's standards.

Alberta Environment Pollution Control Division officials hope to see most of the regional water system in place and fully operational by 1986. The province has assumed financial responsibility for the completion of current projects and designs, but recognizes that the completed system will likely have to be transferred to the new authority.

TABLE 3
INVENTORY OF MUNICIPAL WATER SUPPLY SYSTEMS

MUNICIPALITY	WATER SUPPLY SOURCE	TREATMENT	CURRENT CAPACITY* (Supply Line in mm)	ON THE R.T.L.	TRANSMISSION LINE DESIGN POPULATION	REMARKS	1983 POPULATION	CAPACITY FOR URBAN GROWTH
Beaumont	Leduc-Strathcona Water Board	Edmonton	4,200 (200) Pumping cap. 12,000	YES	11,500	New Reservoir completed, 4500 m^3 storage available.	3,202	High
Bon Accord	Municipal Wells	Iron Removal Complete municipal treatment facilities	3,500	NO	-	Independent Municipal System Presently drilling new well. Future tie into N.E. Water Board line.	1,425	Medium
Calmar	Leduc-Strathcona Water Board	Edmonton	8,000 (300)	YES	8,000	Line completed in 1981. Reservoir has a capacity of 900 m^3.	1,118	Medium
Devon	Municipal System (North Sask. River)	Complete municipal treatment facilities.	6,000	NO	-	With increased pumping capacity (11,000).	3,910	Medium

Note: * Refers to Population Capacity.

R.T.L. - Regional Transmission Line.

m^3 - Cubic metre.

continued...

TABLE 3, continued

MUNICIPALITY	WATER SUPPLY SOURCE	TREATMENT	CURRENT CAPACITY* (Supply Line in mm)	ON THE R.T.L.	TRANSMISSION LINE DESIGN POPULATION	REMARKS	1983 POPULATION	CAPACITY FOR URBAN GROWTH
Edmonton	North Sask. River	Complete municipal treatment facilities.	Plants are continuously upgraded	YES	-	City facilities are the distributing plant for the regional system. 1982 figure for persons supplied is 688,070.	560,085	High
Fort Saskatchewan	North-East Water Board	Edmonton	40,000 (400) (300)	YES	50,000	13,600 m^3 of storage. Two lines serve Town.	12,474	High
Gibbons	North-East Water Board**	Edmonton	10,500 (250)	YES	30,000 If all pumping facilities are installed.	12,000 capacity reservoir, 20,000 capacity with reservoir expansion.	2,592	High
Leduc	Leduc-Strathcona Water Board	Edmonton	40,000 (600) (800)	YES	40,000	New reservoir and pumphouse under construction, 13,638 m^3 storage.	12,500	High

Note: * Refers to Population Capacity.

continued...

** The Town of Gibbons purchases water from the North-East Water Board but is NOT a member of that board.

R.T.L. - Regional Transmission Line.

m^3 - Cubic metre.

TABLE 3, continued

MUNICIPALITY	WATER SUPPLY SOURCE	TREATMENT	CURRENT CAPACITY* (Supply Line in mm)	ON THE R.T.L.	TRANSMISSION LINE DESIGN POPULATION	REMARKS	1983 POPULATION	CAPACITY FOR URBAN GROWTH
Legal	Manawan Drainage Systems	Complete municipal treatment facilities.	4,000	NO	6,000	Water is stored in water impounding reservoir where it is drawn and treated as required. Possible future connection with regional transmission line.	1,042	High
Morinville	Edmonton (Direct Supply)	Edmonton	30,000 (750)	NO	-	Treated water is presently received from the Edmonton plants. 7000 m^3 of storage is available.	5,109	High
New Sarepta	Municipal System (Deep wells)	Iron Removal, Chlorination and Filtration.	1,000	NO	-	900 m^3 reservoir and deep well completed 1982.	461	Medium
Redwater	North-East Water Board	Edmonton	8,000 (250)	YES	8,000	On line storage capacity of 9,100 m^3 completed in 1981.	2,197	High

Note: * Refers to Population Capacity.

R.T.L. - Regional Transmission Line.

m^3 - Cubic metre.

continued...

TABLE 3, continued

MUNICIPALITY	WATER SUPPLY SOURCE	TREATMENT	CURRENT CAPACITY* (Supply Line in mm)	ON THE R.T.L.	TRANSMISSION LINE DESIGN POPULATION	REMARKS	1983 POPULATION	CAPACITY FOR URBAN GROWTH
Sherwood Park	Edmonton (Direct Supply)	Edmonton	Continuous Upgrading Program	YES	78,800	New booster pump completed. 5,900 m^3/2,300m^3/10,000 m^3 of storage.	28,798	High
Spruce Grove	Parkland Water Board	Edmonton	40,000 (600) (300)	YES	40,000	Twinned line installed 600 mm main. A new reservoir is required in future. Improvements required to ensure adequate pressure and flow rate are planned for 1984.	11,307	High
St. Albert	Edmonton (Direct Supply) E.L. Smith Plant	Edmonton	90,000 (1050)	YES	90,000	New reservoir (1980) 1,050 mm line was added in 1981.	35,032	High
Stony Plain	Parkland Water Board	Edmonton	20,000 (400)	YES	20,000	Twinned lines completed in 1981. Reservoir expansion would be required for Westerra expansion. 27,000 m^3 of storage.	5,291	High

Notes: * Refers to Population Capacity.
R.T.L. - Regional Transmission Line.
m^3 - Cubic metre.

3. SANITARY SEWAGE COLLECTION, TRANSMISSION AND TREATMENT

3.1 Introduction

The Edmonton Regional Utilities Study in 1978, identified two major concerns for future discharges of treated sewage effluent in the Edmonton region. The first was that the local receiving streams were becoming hydraulically and biologically incapable of accepting the increasing quantities of effluent, and that these discharges would have to be directed to the North Saskatchewan River. This is the only waterbody in the region capable of accepting the quantities of effluent projected for the year 2001. The second concern was for the quality of the water in the North Saskatchewan, given such future concentrations of effluent discharges.

As a result, Alberta Environment outlined in 1979 a future policy for the Edmonton region which required that all effluent from major communities be discharged into the North Saskatchewan River and that these discharges be treated by a mechanical secondary treatment process (activated sludge). In the medium and long term future, the effluent quality criteria will be generally 20 mg/l of BOD (biochemical oxygen demand) and 20 mg/l of SS (suspended solids) with continuous discharge.

The County of Strathcona, City of St. Albert, Town of Fort Saskatchewan, and the Municipal District of Sturgeon have passed sewage bylaws which parallel that of the City of Edmonton. Prior to any system accepting commercial or industrial effluent, all parties involved review the system requirements and require either pre-treatment to an acceptable level or the payment of surcharges for overstrength effluents for conventional pollutants.

Waste water discharges from some heavy industries, such as refineries and major chemical plants, are treated by the industries involved and are not included in this discussion. Country residential developments in the region generally provide their own sewage treatment and disposal and therefore are not significant in this regional utility system update.

The following section of the report reviews the various administrative arrangements for the collection and treatment of municipal sanitary waste. The section starts with the largest systems, the City of Edmonton's and St. Albert's internal system, follows with the City of Edmonton's direct service to municipalities and concludes with a discussion of independent municipal operations.

The review of each municipal operation includes: an inventory of existing facilities sewage treatment and discharge point, current capacity, inter-municipal transmission design populations (if applicable) and an evaluation of the each system's capacity to accommodate additional population growth.

Figure 2 illustrates the location of the proposed inter-municipal sewage transmission lines and the major sewage treatment facilities in the metropolitan region.

3.2 Edmonton's Facilities

The City of Edmonton operates two sewage treatment facilities: the Gold Bar Wastewater Treatment Plant and the Bremner Lagoon System (See Figure 2).

The recently completed addition to the Gold Bar Wastewater Treatment Plant has increased primary and secondary treatment capacities by 40 percent and 60 percent respectively. The present capacity of the Gold Bar Plant is 320 million litres per day based on dry-weather flow which could serve approximately 600,000 persons and can be expanded to a capacity of 545 million litres per day. The addition of one digester in 1981 and two others after 1984 will improve the sewage treatment process by increasing the retention time. The collection system will continue to be expanded.

The Bremner Lagoon includes anaerobic and facultative lagoons and has an installed capacity of 32 million litres per day.

The City also owns and operates a sludge storage lagoon system about 7 miles from the Gold Bar Plant on a site in the County of Strathcona. This facility is used for the disposal of digested sludge from the Gold Bar Plant.

It should be noted that the Gold Bar site is limited to 545 ML/d unless expansion into adjacent parkland is allowed. This capacity could be reduced if advanced treatment processes are required. It is unlikely the City would build a new plant on the Bremner site as it would use the adjacent Regional Plant.

The Gold Bar Plant and the Bremner Lagoon facilities currently serve Edmonton, Strathcona (Sherwood Park) and CFB Namao.

The City of Edmonton sets a rate for the treatment of wastes by the City for individual communities or for those represented on an inter-municipal group basis.

The existing system is highlighted as follows:

TREATMENT	DISCHARGE POINTS	CURRENT CAPACITY	1983 POPULATION	REMARKS
Bremner Lagoons & Gold Bar activated Sludge Plant	North Sask. River	580,112	560,085	Current capacity reflects Edmonton's and Sherwood Park's current requirements. The plants are being continuously upgraded.

3.3 St. Albert's Facilities

In 1974, St. Albert built a sub-regional transmission line and disposal system (aerated lagoon treatment) discharging treated effluent directly into the North Saskatchewan River. The sewage treatment plant is located directly northeast of the Bremner Lagoons on the north side of the River in the City of Edmonton. This system has been designed with some sub-regional service capabilities. The installed capacity of the system is 10.9 million litres (2.4 million gallons) per day, expandable to about 43.5 million litres (9.6 million gallons) per day. The design capacity of the St. Albert lagoon is about 35,000 persons. Once the new Regional Sewage Treatment Plant is completed, the St. Albert Lagoon will be linked directly into the regional sewage treatment plant in order to accommodate future demand.

Tenders for construction have been initiated for twinning of the existing line over the North Saskatchewan River to tie in with the new Regional Treatment Plant. Longer term design plans call for the Parkland trunk sewer line to parallel the St. Albert line and tie into St. Albert's treatment facility and later the Regional Treatment Plant. The proposed northeast regional trunkline is intended to intersect Parkland's trunk-line and St. Albert's trunklines so as to facilitiate a joint crossing of the North Saskatchewan and a tie-in with the Regional Treatment Plant. The Regional Plant will be operational before the St. Albert outfall line is twinned.

The existing system is highlighted as follows:

TREATMENT	DISCHARGE POINTS	CURRENT CAPACITY	1983 POPULATION	REMARKS
Lagoons aerated	North Sask. River	35,000	35,012	The transmission line capacity is 90,000. Current pumping capacity is 55,000. All future flows over 35,000 would tie into Regional Sewage Treatment Plant.

3.4 Morinville's Facilities

The Town of Morinville currently operates its own independent municipal servicing arrangements for sanitary sewer. The existing operation includes lagoons with anaerobic and aerobic treatment. Additional pumping capacity has been developed for 8,500-9,000 persons. Plans are in process to link Morinville by a regional trunkline (via St. Albert twin

outfall line) to the Regional Sewage Treatment Plant by 1987-88. When the population of the municipality reaches 8,500 the tie with the region-regional system will be necessary. The Town will be connected to the regional system with possible service connections to some M.D. of Sturgeon residents. The Town does not belong to any sewage board and therefore deals directly with the province for funding arrangements.

The existing system is highlighted as follows:

TREATMENT	DISCHARGE POINTS	CURRENT CAPACITY	1983 POPULATION	REMARKS
Lagoons	Manawan Canal	8,500	5,109	Future trunkline and link to Regional Sewage Treatment Plant.

3.5 Sherwood Park's Facilities

With the construction of the Northeast Sanitary trunk sewer the larger serviced boundary area of Sherwood Park is open up for development. This trunkline and the existing 24" outfall line are connected to the south-east regional trunk sewer before discharging into the treatment facilities.

Sewage treatment is presently provided by Edmonton's Bremner Sewage lagoons and supplemented by the St. Albert lagoons, if required. Upon the completion of the Regional Sewage Treatment Plant, the Bremner lagoons will be phased out and the sewage from Sherwood Park will be treated by the new plant. At the present time, adequate treatment capacity is available as well as long term servicing requirements have been considered in trunk sewer development.

The existing system is highlighted as follows:

TREATMENT	DISCHARGE POINTS	CURRENT CAPACITY	1983 POPULATION	REMARKS
Bremner Lagoons	North Saskatchewan River	+30,000	28,798	In the long term the trunk sewer line design population is for 93,700 persons. The existing capacity is being continually upgraded.

3.6 Proposed Inter-Municipal Transmission and Treatment Systems

Operating within the E.M.R.P.C. region are three working associations of municipalities that have formed outside of a formal legal structure. The three working groups of municipalities have formed in different parts of the region. These working groups act as administrative and technical agents working on behalf of their municipalities with Alberta Environment.

It should be emphasized that these municipalities have reviewed and commented on various servicing trunkline schemes proposed by Alberta Environment but have in no way formally agreed to participate in any regional scheme, nor negotiate any final prices for sewage services nor enter into any agreement for operation and development of any sewage transmission system and plant facilities.

The three area municipalities represent an informal technical/political committees, their membership is as follows:

Parkland Area - consists of the Towns of Stony Plain, Spruce Grove and the County of Parkland.

Strathcona-Leduc Area - consists of the City of Leduc, Town of Beaumont and the Counties of Leduc and Strathcona.

Northeast Area - consists of the Towns of Fort Saskatchewan, Gibbons and M.D. of Sturgeon.

TABLE 4

PROPOSED INTER-MUNICIPAL SEWAGE TRANSMISSION AND TREATMENT SYSTEMS

Inter-municipal Arrangements	Municipalities	Current Capacity	Transmission Line Design Population	1983 Population
PARKLAND	Stony Plain	6,000	30,000	5,291*
AREA	Spruce Grove	8,500	40,000	11,307*
STRATHCONA-LEDUC	Leduc	15,000	45,000	13,000*
AREA	Beaumont	4,000	12,000	3,202*
NORTHEAST AREA	Fort Saskatchewan	12,000	60,000	12,474*
	Gibbons	3,500	12,500	2,592*

* near or at system capacity.

Alberta Environment

The Department of Environment has introduced and identified a need for a regional sewage system, in order to protect regional surface water systems. A regional network of sewage transmission lines has been proposed by the Department, which would link various communities with a central treatment plant and facilities in Edmonton. The specific locations of the proposed transmission lines are identified in Figure 2.

Unlike the water transmission servicing schemes the actual development of a regional sewage system is limited at present. The Department's long term proposals involve the construction and operation of a new sewage treatment plant (located to the west of the Bremner lagoon site) connected to five trunk sewer lines.

The following list represents projects proposed and/or initiated by the Department of Environment. The scheduling of projects reflects the Departments time line perspectives only.

Regional Sewage Treatment Plant

- Alberta Environment has finalized the designs for a new regional sewage treatment plant. Construction commenced in 1982 with an anticipated completion date for phase one being 1985 or early 1986.

- The ultimate capacity of the Regional Sewage Treatment Plant was reported as 455 million litres (100 million gallons) per day. The first stage of the sewage treatment plant has been designed for a capacity of 90 million litres (20 million gallons) per day capable of serving a population of 186,000 to 223,000 persons. The construction of the plant will be staged, based on 90 m^3/d (20 mgd) modules.

Parkland Trunk Sewer Line

- The design of the Parkland twin sewer line between Stony Plain and Spruce Grove is completed. Final negotiations with the Board for completing land acquisition are underway and construction started in September, 1983 and the second phase is to be awarded in the near future.

- Construction started in 1983 on the next segment from Spruce Grove to a point south of Big Lake. From a pumping station, south of Big Lake sewage will flow to the St. Albert outfall line.

- The Parkland Board has entered into an agreement with St. Albert for use of the latter's treatment facility and for cost sharing. The construction of St. Albert's outfall twinline is scheduled for 1986-1990.

- The Morinville tie into the St. Albert system will depend on future growth; the expected tie-in is scheduled for 1984-1985. Morinville will have its own independent link to the regional transmission system, proposed tie in with Regional Sewage treaTment Plan is for 1987-88.

Strathcona-Leduc Trunk Sewer Line

- The initial stage of the southeast regional trunkline was built two years ago to serve Sherwood Park and parts of the County of Strathcona. The line has been constructed to the south of Highway 16. Sewage will continue to be treated in the Bremner Lagoon until such time as the regional facility is in place.

- Design reports have been completed for the Strathcona sewage line to extend to an area west of Beaumont. Beaumont is scheduled to hook into regional transmission lines in 1985 with an interim connection to the City of Edmonton. The City of Leduc is scheduled for a hook-up to a regional trunkline in early 1984. The last phase of the gravity system to tie into the City of Edmonton trunk sewer system with the proposed interim connection remains to be completed.

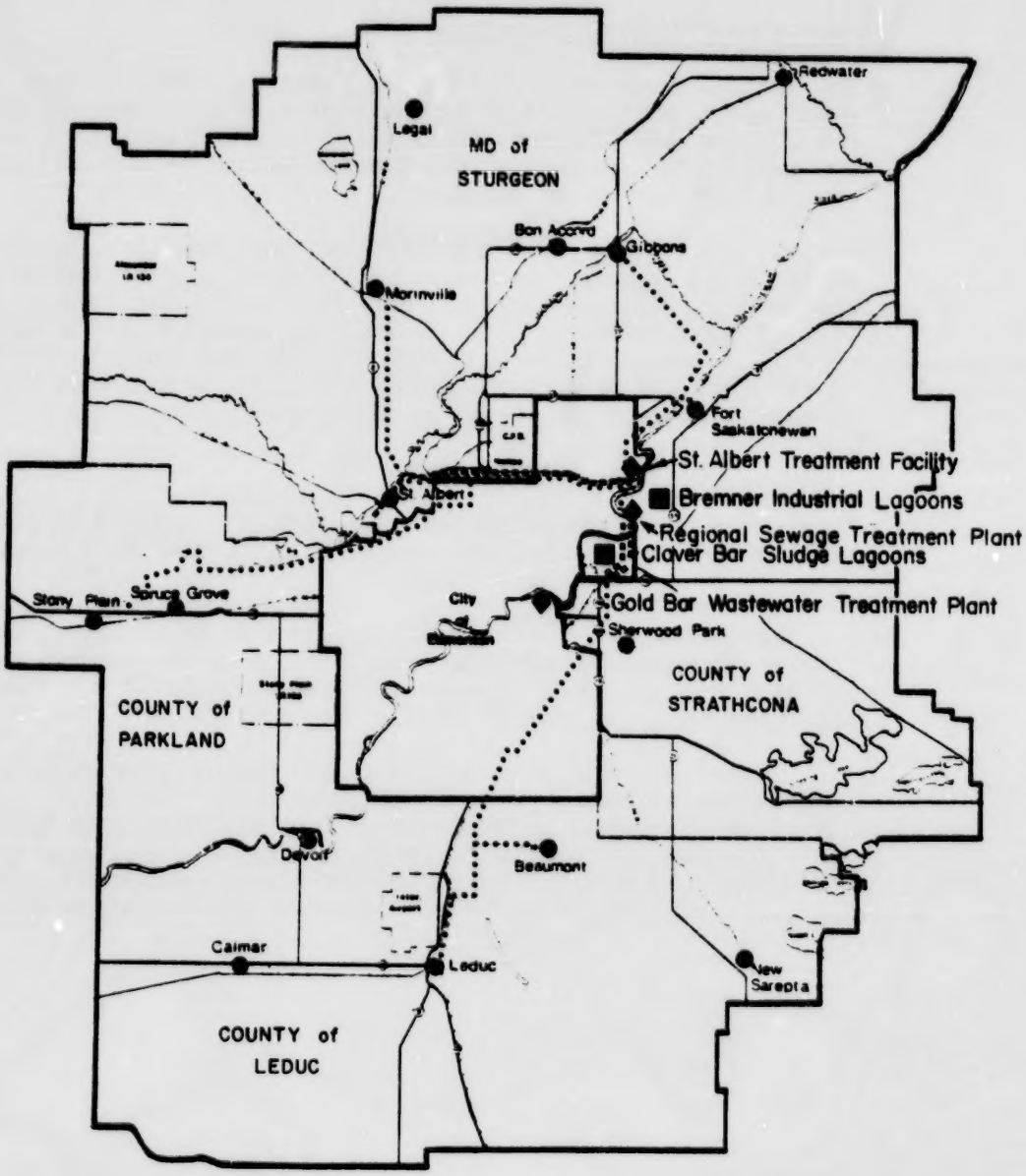
Northeast Trunk Sewer Line

- A design report entitled Northeast Regional Trunk Sewerage Transmission Facility was prepared in February 1982 and serves as a basis for this line.

- The design stage of the Northeast sewage line is nearly complete. The line is proposed to serve Gibbons, Fort Saskatchewan and the M.D. of Sturgeon. A temporary tie-in would be established to link the St. Albert outfall line with the future regional plant.

As identified in Table 4 of this report, the municipalities listed are all at or near capacity in their present sewage treatment systems and require some immediate attention so to solve their long term requirements. Discussions continue between affected municipalities and Alberta Environment regarding proposed trunk sewer servicing schemes and individual municipal proposals for upgrading their existing systems.

REGIONAL UTILITIES SYSTEM INVENTORY



PROPOSED INTERMUNICIPAL SEWAGE TRANSMISSION LINES AND TREATMENT FACILITIES

LEGEND

Source: ALBERTA ENVIRONMENT

..... Existing Trunk Lines
..... Proposed

◆ Treatment Plant
■ Lagoon

N

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November, 1983

FIG. 2

3.6 Independent Municipal Systems

Alberta Environment regulates the construction and operation of municipal sewage systems. A number of municipalities in the region operate their own sewage treatment systems, partly because of the greater geographic distances to central treatment plants in Edmonton, as well as diseconomies of scale for smaller communities.

The municipalities of Bon Accord, Calmar, Devon, New Sarepta, Redwater and Legal are not included in the Regional Transmission System. With the exception of Devon, these communities operate conventional sewage lagoon systems which include anaerobic lagoons, aerobic lagoons and storage lagoons. The Town of Devon operates a rotating biological contactor (R.B.C.) plant.

The most serious and frequent problem with conventional lagoon systems is flooding in the receiving stream. Often these streams are at or near their maximum hydraulic capacity to receive and to dilute effluent within the required guidelines. Another problem is the limited size of storage capacity for most lagoon systems.

The following table highlights the independent municipal sewage systems servicing capacities.

MUNICIPALITY	DISCHARGE POINT	CURRENT CAPACITIES	1983 POP.	REMARKS
Bon Accord	Sturgeon River	3,500	1,425	7 months storage only currently available.
Calmar	Conjuring Creek	1,118	1,118	Expansion of the system is needed, possible future connection to Regional transmission system.
Devon	North Sask. River	5,500	3,931	With minor expansion capacity can be expanded to 11,000.
Legal	Legal Creek, Redwater River	2,050	1,042	Expansion of lagoons will be necessary for additional capacity.
New Sarepta	Clearwater Creek	1,000	461	Recently upgraded.
Redwater	Redwater River	3,000	2,197	Additional storage capacity required for expansion.

The largest independent municipal system is operated by the Town of Devon, which draws water from the river. Treated effluent is then returned to the same river. Both these utility systems currently meet all of Alberta Environment's standards. However, there is concern regarding Devon's discharges of effluent into the North Saskatchewan less than 7 km upstream from the E.L. Smith water treatment plant which supplies most of Edmonton and the region. The City of Edmonton monitors the river to be aware of fluctuations in water quality.

3.7 Summary

The proposed regional system should be completed by 1986 according to Alberta Environment Officials. The sizing capacities of the regional system were generally based on 25 year projections for the year 2005. This is identical to the likely debenture period for utility services.[1] The total costs for the Regional Sewage Plant and trunklines is anticipated to be approximately $200 million.

Table 5 provides an inventory of all municipal sewage systems discussed in this section.

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[1] E.R.U.S. 1978 study recommendations.

TABLE 5
INVENTORY OF MUNICIPAL SEWAGE SYSTEMS

MUNICIPALITY	TREATMENT	DISCHARGE POINT	CURRENT CAPACITY*	ON THE R.T.L.	TRANSMISSION LINE DESIGN POPULATION	REMARKS	1983 POPULATION	CAPACITY FOR URBAN GROWTH
Beaumont	Lagoons - anaerobic and aerobic	Living creek Blackmud Creek into the North Sask. River.	4,000	YES	12,000	Current facilities are at capacity, should tie into the regional line in 1985 with an interim connection into Edmonton Trunk System.	3,202	High
Bon Accord	Lagoons - aerobic	Sturgeon River	3,500	NO	-	7 months storage is currently available.	1,425	Medium
Calmar	Lagoons - anaerobic and aerobic	Conjuring Creek	1,118	NO	-	Expansion needed, location studies are now in progress. Possible future connection to regional transmission line.	1,118	Low
Devon	Biological (R.B.C.) Primary and Secondary Clarifiers	North Saskatchewan River	5,500+	NO	-	With minor expansion, the existing system can service 11,000 persons.	3,910	High

continued...

Note: * Refers to Population Capacity.
R.S.T.P. - Regional Sewage Treatment Plant
R.B.C. - Rotating Biological Contactor
R.T.L. - Regional Transmission Line, this refers to proposals by Alberta Environment to construct regional trunk sewer lines, the timing of future connections to facilities refers to the department's projected time uses only.

TABLE 5, continued

MUNICIPALITY	TREATMENT	DISCHARGE POINT	CURRENT CAPACITY*	ON THE R.T.L.	TRANSMISSION LINE DESIGN POPULATION	REMARKS	1983 POPULATION	CAPACITY FOR URBAN GROWTH
Edmonton	Activated Sludge	North Saskatchewan River	Plants are continuously upgraded.	NO	-	May connect with R.S.T.P. at a future date.	560,085	High
Fort Saskatchewan	Lagoons - anaerobic	North Saskatchewan River	12,000	YES	60,000	At capacity now.	12,474	High
Gibbons	Lagoons - anaerobic and aerobic	Sturgeon River	3,000	YES	12,500 (20,000)	85-86 - Future tie with R.S.T.P. Regional transmission line has an ultimate capacity of 20,000.	2,592	High
Leduc	Secondary Treatment	Telford Lake into Blackmud Creek.	15,000	YES	45,000	85-86 - treatment at regional plant.	12,500	High
Legal	Lagoons - anaerobic and aerobic	Legal Creek into the Redwater River	2,050	NO	-	When additional sewage capacity is required, an expansion of the lagoon facility will be necessary.	1,042	Medium

continued...

Note: * Refers to Population Capacity.
R.S.T.P. - Regional Sewage Treatment Plant
R.B.C. - Rotating Biological Contactor
R.T.L. - Regional Transmission Line, this refers to proposals by Alberta Environment to construct regional trunk sewer lines, the timing of future connections to facilities refers to the department's projected time uses only.

TABLE 5, continued

MUNICIPALITY	TREATMENT	DISCHARGE POINT	CURRENT CAPACITY*	ON THE R.T.L.	TRANSMISSION LINE DESIGN POPULATION	REMARKS	1983 POPULATION	CAPACITY FOR URBAN GROWTH
Morinville	Lagoons - anaerobic and aerobic	Manawan Canal	5,500 Add pump capacity 8500-9000	YES	20,000	New aerobic system in 1980 tie-in R.S.T.P. 85-86.	5,109	High
New Sarepta	Lagoons - anaerobic and aerobic	Clearwater Creek	1,000	NO	-	Recently upgraded 1981 (location changed to SW 32-49-22-W4).	461	Medium
Redwater	Lagoons - anaerobic and aerobic	Redwater River	3,000	NO	-	Additional storage capacity required for future population increase.	2,197	Low
Sherwood Park	Bremner Lagoons (City of Edmonton)	North Saskatchewan River	30,000	YES	93,700	Currently uses portion of regional line now to Bremner. Tie into R.S.T.P. in 85-86.	28,798	High
Spruce Grove	Lagoons - anaerobic and aerobic	Atim Creek	8,500	YES	40,000	At capacity now. Regional line under construction tie into R.S.T.P. 85-86.	11,307	High

continued...

Note: * Refers to Population Capacity.
R.S.T.P. - Regional Sewage Treatment Plant
R.B.C. - Rotating Biological Contactor
R.T.L. - Regional Transmission Line, this refers to proposals by Alberta Environment to construct regional trunk sewer lines, the timing of future connections to facilities refers to the department's projected time uses only.

TABLE 5, continued

MUNICIPALITY	TREATMENT	DISCHARGE POINT	CURRENT CAPACITY*	ON THE R.T.L.	TRANSMISSION LINE DESIGN POPULATION	REMARKS	1983 POPULATION	CAPACITY FOR URBAN GROWTH
St. Albert	Lagoons - aerated	North Saskatchewan River	35,000	YES	90,000	All future flows over 35,000 would tie into regional treatment plant. Current pumping capacity - 55,000.	35,032	High
Stony Plain	Lagoons - anaerobic and aerobic	Atim Creek	5-6,000	YES	30,000	First phase R.T.L. under construction. Tie-in 85-86 with regional treatment plant.	5,291	High

Note: * Refers to Population Capacity.
R.S.T.P. - Regional Sewage Treatment Plant
R.B.C. - Rotating Biological Contactor
R.T.L. - Regional Transmission Line, this refers to proposals by Alberta Environment to construct regional trunk sewer lines, the timing of future connections to facilities refers to the department's projected time uses only.

4. SOLID WASTE DISPOSAL

4.1 Introduction

Solid waste management is generally a municipal responsibility regulated in the Province of Alberta under the Public Health Act, administered by the Minister of Social Services and Public Health. Pursuant to the Act, the Alberta Provincial Board of Health provides technical guidelines for solid waste disposal, control of refuse systems and for the design and operating standards for sanitary landfills.

Since 1967, the Regulations of the Public Health Act have required all waste disposal sites in Alberta to hold a permit issued by the Provincial Board of Health. Prior to 1967, a permit was required only if the proposed site did not meet the minimum regulations but was considered suitable by the Board of Health.

The Board of Health issues permits for sanitary and modified landfills, dry disposal sites, transfer stations and unclassified disposal systems. All waste disposal sites for municipal refuse are inspected and licensed by the local health units.

Two branches of Alberta Environment have related programs for solid waste management. The Waste Management Branch of the Pollution Control Division coordinates provincial programs for waste disposal and recycling, and coordinates the opening of regional landfill sites. Since 1979, the Reclamation Branch of the Land Reclamation Division has rehabilitated closed land disposal sites under a program funded by the Alberta Heritage Trust Fund. To date, over 160 sites have been rehabilitated.

Alberta Environment has recently published a report entitled "Identification and Verification of Active and Inactive Land Disposal Sites in Alberta". A total of 1,152 sites were identified and further screened on a priority ranking system in order to identify problem sites. Information pertaining to name, location, owner, size, status and priority is summarized in Appendix 2.

In the Edmonton metropolitan region most sites are either sanitary landfills or modified landfills. A sanitary landfill is a properly engineered facility for the disposal of domestic, commercial and industrial solid wastes. In smaller rural communities, the disposal sites are frequently modified landfills or open dumps, with occasional cover. These systems receive all types of liquid and solid waste since they usually are the only available disposal site.

Two of the fourteen regional waste management systems existing in the province operate within this planning region - in the County of Leduc and the Municipal District of Sturgeon. These systems are intended to reduce the total number of operating disposal sites, and use transfer stations for local temporary collection and storage of waste before it is transferred to the regional sanitary landfill site.

The following section of the report reviews the major sanitary landfill sites operated by the City of Edmonton, discusses two regional boards and briefly describes other municipal and private waste disposal sites. Figure 3 identifies the major regional waste disposal sites.

4.2 Edmonton's Facilities

The City of Edmonton presently operates its own landfill site to which non-Edmonton customers and some municipalities, also deliver refuse.

The Clover Bar Sanitary Landfill Site consists of about 81 hectares of land located in the northeast corner of the City along the south bank of the North Saskatchewan River.

The site is about half completed, with the eastern half of the site having been landfilled and covered. Available space will be filled about 1986 at which time a new site will have to go into operation.

At the present time, the City of Edmonton is looking for a suitable landfill site to replace the Clover Bar site. An earlier consultant's study identified twelve candidate areas within 16 kilometers of the preannexation boundaries. Current efforts are directed towards establishing which other waste disposal method(s) might be used to reduce the need for landfill and their associated additional costs.

Presently all but 5% of the City's non-toxic waste is landfilled at the Clover Bar site. Disposal of the remaining 5% takes place at the Genstar site near 125th Avenue and 170th Street in west Edmonton.

The Clover Bar site also accepts waste from the County of Strathcona, Fort Saskatchewan, Sherwood Park and Namao. This waste disposal accounts for about 5% of the total annual volume.

Of the 1.3 million tonnes hauled to the Clover Bar Sanitary Landfill in 1981, the City of Edmonton collection vehicles accounted for 9%, private citizens for 5% and commercial and industrial haulers for 82%. The cost of residential collection in Edmonton in 1981 was $10.95 per capita per year or $0.91 per capita per month.

The Genstar site is located within the City of Edmonton western boundary at the Inland Cement plant. The sanitary landfill operation has been established as a secondary business to clay extraction for cement production. Refuse is used to fill in the excavated areas left by the clay mining operation. The site is expected to be available for disposal of wastes for at least 20 years.

St. Albert, portions of the County of Parkland and the community of Spruce Grove make use of this disposal site. St. Albert has plans to extend the present agreements for another 10 years.

The City of Edmonton hauls approximately 75% of Edmonton's residential waste to the Clover Bar and Genstar sanitary landfills via one of three transfer sites. At the Coronation and Strathcona transfer stations the refuse is shredded and transferred to long haul tractor trailer units. The Kennedale station has a direct transfer operation.

City of Edmonton records show that in 1980, 1,325,000 tonnes of waste were landfilled at the two sites serving Edmonton (Genstar and Clover Bar). The City's wastes were recorded at 1,240,000 tonnes. The average total daily waste generation was calculated at 6.7 kg/capita/per day. Waste generation has dropped drastically since 1980, waste landfilled at Clover Bar was 569,000 tonnes in 1983. Drop was primarily in amount of rubble and construction waste.

Within the City of Edmonton there is one private industrial site operated by Hood Enterprises. The site is located north of the Genstar site in the City of Edmonton and is operated as a dry landfill site. This site is used by private contractors for the disposal of materials which do not decompose, i.e. construction debris, insulation materials and metal products.

4.3 Regional Landfill Sites

Two Regional Boards have recently formed to provide, on a district basis, a cooperative service for the participating membership. The Leduc Regional Waste Management Authority and the Sturgeon Sanitary Landfill Authority operate and maintain two landfill sites, as identified on Figure 3.

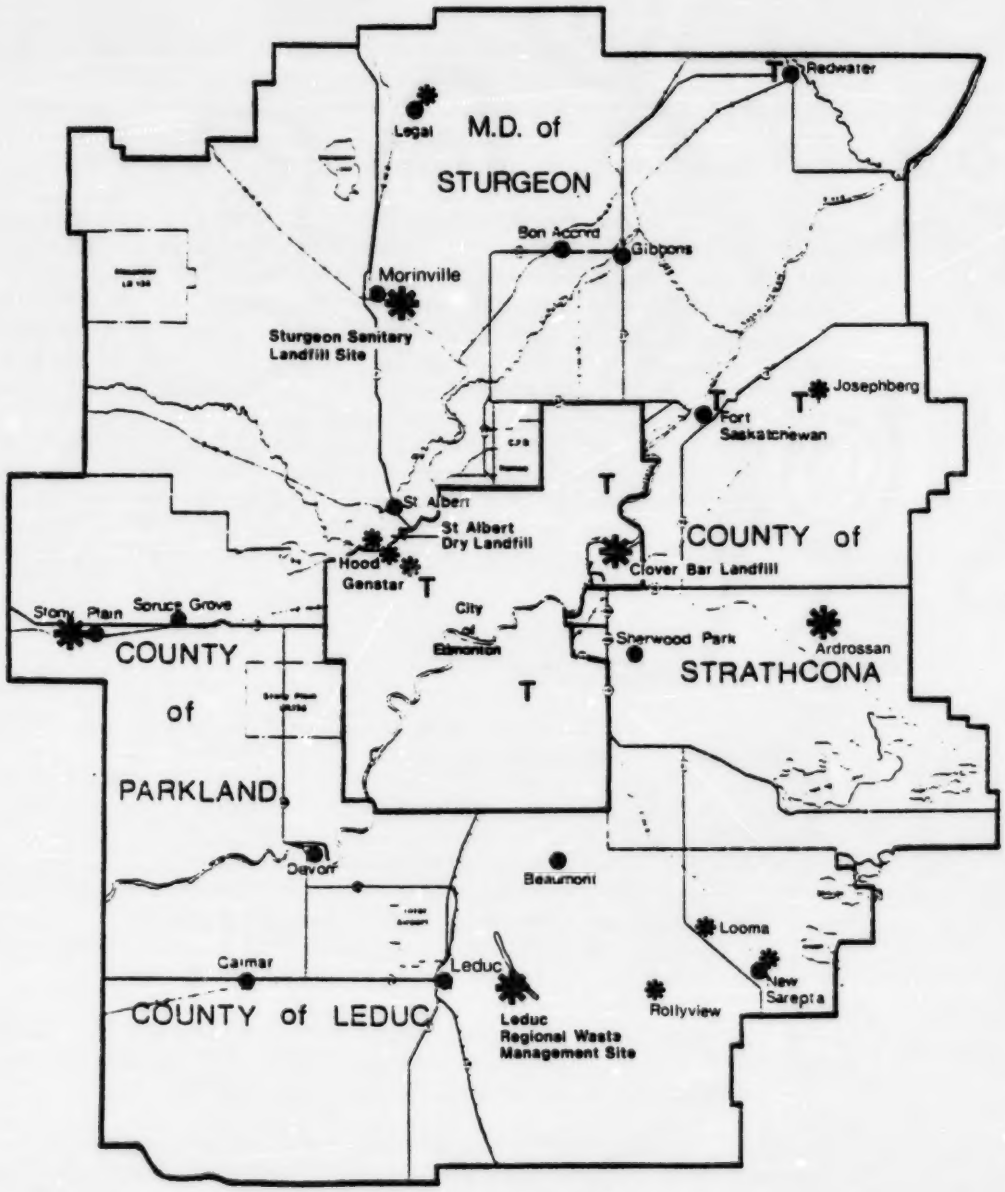
The Sturgeon sanitary landfill site is located east of Morinville. This 120 acre facility presently serves Redwater, Gibbons, Bon Accord, Legal, Morinville and the M.D. of Sturgeon. The M.D. of Sturgeon site replaces the reclaimed Cardiff site located south of Morinville.

The 160 acre Leduc regional waste site is used by the City and County of Leduc, Towns of Beaumont, Calmar, Devon and the Nisku industrial area. The landfill site is located 3 miles east of Leduc.

Under a regional waste management plan, several communities cooperatively use and operate one regional sanitary landfill instead of several smaller ones. Alberta Environment statistics show that, in addition to environmental advantages, it can cost less to operate one large site for several users than several small sites for the same users.

The municipalities of the City of Edmonton, County of Strathcona, City of St. Albert, Town of Morinville, Beaumont, Fort Saskatchewan, Leduc, Stony Plain, Spruce Grove, and County of Parkland have recently requested the Minister of Environment to undertake a joint regional study on solid waste management and resource recovery.

REGIONAL UTILITIES SYSTEM INVENTORY



INTERMUNICIPAL DISPOSAL SITES

LEGEND

Source: ALBERTA ENVIRONMENT

- Active Landfill Sites ⟩ 50 acres
- Active Landfill Sites ⟨ 50 acres
- T Transfer Station

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Edmonton Metropolitan
Regional Planning Commission

November, 1983

FIG. 3

4.4 Independent Municipal Disposal Sites

Aside from the two regional landfill sites and the City of Edmonton facilities, the remaining municipalities utilize independent landfill sites for the disposal of wastes, and generally no treatment is undertaken prior to the disposal of wastes. Many municipalities are finding it increasingly difficult to effectively dispose of their wastes due to legislation which restricts the methods of treatment and disposal and the increasing costs. A further problem is that municipalities often have difficulty obtaining sites which meet Alberta Environment's standards.

Alberta Environment has started a Solid Waste Management Assistance Program to encourage municipalities with open dumps to switch to sanitary landfills.

The Provincial Inventory Report has identified many active and inactive land disposal sites within the region. A computerized list of the sites is provided in the appendix. Several independent municipal disposal sites operate within this region. Generally old municipal dumps are found within or near existing communities. These sites are available for use by small businesses who haul in their own wastes and by individuals from the community.

The County of Strathcona, has several municipal disposal sites with one of the largest being the 160 acre Ardrossan site. Local residents also dump refuse at the Josephburg transfer station from where waste is subsequently hauled to the Clover Bar site operated by the City of Edmonton. The remaining active sites serve the adjacent rural community. In its recently initiated solid waste management study, the County is examining existing and future service arrangements, collection costs, future residential waste volumes, and is assessing appropriate collection methods.

The County of Parkland and the Towns of Spruce Grove and Stony Plain have completed a Regional Waste Haulage Study in 1982. This study was initiated under the solid waste management assistance program to assess the advantages of haulage of waste on a region wide basis and of forming another regional waste management authority. To date no progress has made on the formation of such an authority.

The Stony Plain disposal facility is used by the municipality and by County of Parkland residents. The County of Parkland provides no municipal collection; private contractors serve rural residents and businesses. The City of St. Albert does not have its own site in operation but uses the Genstar Site in the City of Edmonton.

4.5 Summary

The Provincial inventory, discussed earlier in the text, revealed a number of key issues in solid waste management and identified potential problem sites in the province.

Key problems identified in study are as follows:

(1) The Provincial inventory is not complete since some industrial site waste management practices are unknown.

(2) Very little documentation is available regarding the type of waste received at modified landfills because these sites are generally unsupervised. It is likely that disposal of hazardous wastes is occurring at modified landfill sites.

(3) There is only one pesticide container disposal location in the Province. Alberta Environment issues contracts for the collection, crushing and storage of pesticide containers in a warehouse in Nisku, while awaiting construction of disposal facilities for hazardous wastes.

Through the use of a priority ranking system (screening system), the inventory process has identified land disposal sites with potential problems. In this region, several active and inactive problem sites were identified. (It should be noted that the priority ranking system did not take into account that these sites have been engineered to minimize or eliminate potential problems associated with site conditions.)

TABLE 7
ACTIVE PRIORITY[1] SITES (in order of severity)

Municipality	Current Use	Problems Identified
New Sarepta	Open dump	- close to water - close to village - surface water contact - adjacent to surface water
Clover Bar	Sanitary Landfill	- institutional wastes - close to residential areas - leachate problems - contact with water table - surface water contact
Ardrossan	Modified Landfill	- contact with water table - close to hamlet - adjacent to surface water
Genstar Site	Sanitary Landfill	- institutional wastes - permeable site - leachate problems
Stony Plain	Modified Landfill	- pesticide collection site - permeable site - close to town

TABLE 8
INACTIVE PRIORITY[1] SITES

Municipality	Current Use	Problems Identified
Calmar	Public Works Yard	- close to water - close to town - contact with water table - site is settling
Leduc Regional Old Site	Agriculture	- institutional wastes - leachate problems - contact with water table - close to wells
Gibbons	Agriculture	- permeable site - close to town - adjacent to surface water

Source: Alberta Environment. Identification and Verification of Active and Inactive Land Disposal Sites in Alberta. Main Report. Edmonton. Alberta Environment, October 1982.

Notes to Accompany Tables 7 and 8 and Appendix 2

Location - The legal description of the site location.

Health Unit - The health unit within which the site is located.

Owner - The owner's name is recorded. If the owner is not known, "-" is recorded.

Status - "A" means the site is active. "I" means the site is inactive.

Size - The area of the site in acres. If the area of the site is not known, "-" is recorded.

Priority - The priority of the site is ranked on a scale of Ranking 1 to 3 based on the scoring system. The scoring system is designed to evaluate standard criteria characteristics.

Priority 1	100 points or more
Priority 2	75-99 points
Priority 3	less than 75 points

The scoring system emphasizes problems related to surface and groundwater contamination and proximity to human habitation.

Priority 1 sites are potential problem sites, however, further research is required to determine the extent of the problem or whether a problem does exist.

5. FINANCIAL ASSISTANCE PROGRAMS

5.1 Introduction

This section of the report reviews the current provincial servicing programs available to municipalities for the provision of utility services. An overview of the financial assistance programs is provided, rather than a detailed description of individual municipal financial arrangements.

Within the region almost all aspects of water supply, sewage system, solid waste disposal are under the jurisdiction of certain Provincial Acts and Regulations. The scope of the Provincial Acts includes: Environment Act, Water Resources Act, Clean Air Act, Public Health Act, Land Surface Conservation and Reclamation Act and Alberta Municipal Financial Corporation Act.

Several financial assistance programs for municipal utility services are administered by various Provincial departments. A list of programs by Provincial department and with a short description of each follows.

Environment:

(1) Financial Assistance for water management.
(2) Alberta Waste Management Assistance Program.

Home Mortgage Corporation:

(3) Revolving Trunk Servicing Program

Utilities and Telecommunication

(4) Municipal Water Supply and Sewage Treatment Grant Program
(5) Regional Water and Sewage Grant Program

5.2 Programs

(1) Financial Assistance for Water Management

The objective of the program is to provide assistance to local authorities for the enhancement and regional development of the Province's water resources and to provide corrective measures where water, in its natural state, creates conditions adverse to the public interest (i.e. flood control and flow regulation projects). The local authority initiating the project must accept the responsibility for land acquisition, and operating and maintenance costs. Agreements are entered into between the Minister of Environment (under the Water Resources Act) and the local authorities. The project must fit within the budgetary priority for water management

established by the government. Payment is usually on a 75%-25% basis, with the Province undertaking the larger share depending upon the type of project and the amount of public benefit derived.

A Provincial budget of $6.7 million has been established for this program in 1983-84.

(2) Alberta Waste Management Assistance Program

The objective of the program is to promote environmentally sound waste management throughout the Province. The program is available to all rural and urban municipalities who form a regional authority consisting of two or more urban municipalities plus one or more rural municipalities. The Province will provide land and capital funding for regional sanitary landfill sites or other facilities for waste management.

The Province (through the Department of Environment) will pay 100% of the fair market value for the land and lease it in turn to the municipality for use as a sanitary landfill.

The Province will pay up to 100% of the initial capital costs of the systems. This first, involves funding for municipalities undertaking biological and hydraulic investigations to identify suitable landfill locations. The second part of the program is for groups of municipalities which, participating in a regional waste management authority, require funds for the capital financing of a waste disposal site or additional funds for cost sharing transportation haulage costs to regional sites. The annual operating costs are the responsibility of the regional authority.

A Provincial budget of $2.9 million has been established for this program in 1983-84.

(3) Revolving Trunk Servicing Program

Alberta Home Mortgage Corporation will construct and initially own major underground water and sewer services in order to reduce the financial burden of growth on municipalities by providing financial funding. Eligible items for project funding are off-site or oversized water and sewer facilities in the following categories:

(a) water trunks, pumping stations and distribution system reservoirs;

(b) stormwater trunks and major stormwater management facilities; and

(c) sanitary sewer trunks and lift stations.

The program is intended to increase the supply and help stabilize the price of serviced lots. The municipal obligation is to purchase a minimum 50% interest in the facilities within a 10 year period. The applicant's (municipality or developer) responsibility is to negotiate the rights-of-way for construction on behalf of A.H.M.C.

A Provincial budget of $20 million has been established for this program in 1983-84.

(4) Municipal Water Supply and Sewage Treatment Grant Program

This grant program has been recently transferred to the Department of Utilities and the Telecommunications. The grant program was introduced in 1979 to assist municipalities with the capital cost of installing modern and adequate facilities for water supply and sewage treatment. The municipal grant program, now administered by the newly created Municipal Utilities Division, is available to all municipalities and administrative bodies established under the Municipal Government Act. Edmonton has not participated in this program in the past and will not be eligible under the revised program in the foreseeable future.

The program recognizes two categories of funding. One is for municipalities who are upgrading or replacing their present supply and treatment facilities, and the second for those who are installing new public waterworks and/or sewage system where previously none existed.

Financial assistance can be claimed for the following components of an existing system: a trunk sewer from the end of the collection system to treatment plant, sewage treatment facility; and an outfall line to the point of final discharge.

In an existing waterworks system, the following components can be considered for funding: a raw water intake and supply line, including wells; a water treatment facility; a water storage facility and a water transmission line up to the distribution system.

Changes to the funding arrangements were announced in July 1983. The major changes are:

(a) Project costs will be shared on a 75/25 provincial-municipal basis for the first 600 persons, and on a 50/50 basis for the population from 601 to 100,000; and

(b) The per capita qualifying contribution required from municipalities has been eliminated, and first-dollar sharing of project costs has been introduced.

A Provincial budget of $70 million has been established for 1983-84 for this program.

(5) Regional Water and Sewage Grant Program

The Minister of Utilities and Telecommunications is responsible for the administration, implementation and interpretation of this program.

The Department will conduct studies to determine the feasibility of regional water and sewage schemes for specific areas of the province, purchase any portion of a facility or establish any new facility that is required for a regional system. Municipalities are to be compensated when Department requires over-sizing or extra capacity to be built into the facilities for future users. Boards, composed of the user municipalities, may be established for management and administration of regional systems and a grant is available to these same boards.

Eligibility for grant assistance requires an expenditure of $300 per capita on water supply works or sewage treatment works. When a regional scheme is constructed, the municipalities serviced would be responsible for $300 per capita plus 10% of the balance of the project. The qualifier will increase to $325 per capita on April 1, 1984.

The Provincial budget for this program is $50 million for the year 1983-84.

NOTE: Source material for this section was taken from:

Alberta Department of Municipal Affairs. Municipal Services Branch. Alberta Municipal Assistance Programs 1983. Edmonton. Department of Municipal Affairs, August 1983.

6. PROPOSED EDMONTON REGIONAL MUNICIPAL SERVICES COMMISSION

6.1 Introduction

The proposal for the creation of the Edmonton Regional Municipal Services Commission is a direct consequence of the "Report and Decision Concerning the Edmonton Annexation Application", June 1981, and the Regional Municipal Services Act, Chapter R-9.1, 1981, given assent on December 2, 1981. These documents provide the authority for the establishment, by Order-in-Council, of a corporation whose members are municipalities and whose directors are appointees from the councils of those municipalities, in such numbers as the Minister of Municipal Affairs may direct.

As stated in Section 3 of the Act, the objectives of the Commission are "to provide water, sanitary and storm sewerage and waste management services or any of them with respect to more than one municipality".

The Lieutenant Governor-in-Council is empowered to appoint the Chairman of the Board of a Regional Services Commission. A Regional Services Commission, for the purposes of achieving its objectives, may:

"(a) acquire and finance, construct, operate and dispose of water lines, sanitary or storm sewer lines, and water, waste and sanitary or storm sewerage plants and facilities;

(b) employ persons necessary to carry out its operations and terminate the employment of persons employed by it;

(c) ...acquire by purchase, expropriation or otherwise and dispose of any estate or interest in real property;

(d) engage the services of a bank, trust company, treasury branch, credit union or other financial institutions;

(e) borrow money on its credit;

(f) issue notes, bonds, debentures or other evidence of indebtedness;

(g) draw, make, accept, endorse, execute and issue promissory notes, bills of exchange or other negotiable or transferable instruments;

(h) enter into agreements with the Government of Alberta, the Government of Canada, the Government of a Province of Canada, an agency of any of those governments, a municipal authority in Alberta or any other person;

(i) invest its funds that are not immediately required by it in authorized trustee investments;

(j) charge for its services."

The Department of Municipal Affairs has engaged a private consultant, Mr. Geoffrey Hamilton, to use the existing legislation to provide on behalf of the Province a framework for the Edmonton Regional Municipal Services Commission's operation. The following remarks on the proposed operation and function of the Edmonton Regional Municipal Services Commission represent a synopsis of the consultant's public comments. It should be remembered that these comments are not, as yet, official Provincial policy.

"The Commission will be a crown corporation, and is an entirely new entity for the Province. There will be no appeals from its decision except by Cabinet or legal action by aggrieved persons. The Commission will be owner and operator of many substantial properties including not only large transmission lines, sewage treatment plants, landfill sites, and other properties as well. It will be a corporation initially in the $200 million[3] range growing to perhaps several times that size. It will own property, buy, sell, operate, monitor, finance, acquire, contract out, contract in, and make long-term investments in anticipation of future demands.

Inevitably it will be no stranger to litigation or to public scrutiny. From the outset it must have strong legal, financial and administrative departments, remembering that it will have a monopoly control of the supply and handling of the most basic services, water supply and waste disposal."[2]

6.2 Consultant's Recommendations

Mr. G. Hamilton prepared for the Minister of Municipal Affairs some guideline considerations on the establishment of the Edmonton Regional Municipal Services Commission.

Extracts from a letter to the Minister dated July 20, 1982 read:

(1) The Commission should be established initially with a minimum rather than a maximum number of municipal members, consistent with the extent of presently installed systems and with plans and commitments for new facilities and extensions.

(2) The large question of Edmonton's membership in the Commission should take into account the dependence of the Commission on Edmonton's water supply and on Edmonton's need to use the regional

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[2] G. Hamilton, Notes on the Proposed Edmonton Regional Municipal Services Commission, Preliminary Discussion Report, March 1982.

[3] An article in the Edmonton Journal on May 6, 1982 quoted Mr. G. Hamilton as saying "assets will initially be about $300 million and could eventually top $1 billion".

sewage treatment plant; neither situation demands that Edmonton be a member, for the present at least.

(3) The takeovers of municipal plants and facilities should be governed by the simple but important precedent set at the time of Metropolitan Toronto's founding, namely, outstanding debt.

(4) Special situations, whether historical or geographical, should be dealt with accordingly.

(5) Transition to uniform rates throughout the region should be achieved gradually, beginning with rates for each commission line being set at least sufficient to recover current costs.

6.2.1 Membership

Membership would be restricted initially. It would include only those municipalities, which are presently involved in inter-municipal servicing arrangements regarding water, sewage or waste management, or which are seen as likely to be so in the near future.

Concerns regarding the status of the large federally owned or directed entities within the region - CFB Namao, Edmonton International Airport, the Federal Penitentiary and Indian Reserves - still require a decision by the Minister regarding their membership status.

At present the City of Edmonton has expressed no interest in joining the Commission, since it believes no benefits would be conferred but liabilities might be implied. There have been suggestions that the City should have observer status and should provide expert technical services, as negotiated by the Board.

Mr. Hamilton has recommended that the following municipalities be members of the Edmonton Regional Municipal Services Commission.

IN E.M.R.P.C. REGION	OUTSIDE E.M.R.P.C. REGION
City of St. Albert	Town of Bruderheim
City of Leduc	Town of Lamont
County of Leduc	Town of Mundare
County of Parkland	Town of Vegreville
County of Strathcona	Village of Chipman
M.D. of Sturgeon	
Town of Beaumont	
Town of Calmar	
Town of Fort Saskatchewan	
Town of Gibbons	
Town of Morinville	
Town of Redwater	
Town of Spruce Grove	
Town of Stony Plain	

6.2.2 Range of Activities and Responsibilities

The consultant has made a number of recommendations to the Minister of Municipal Affairs on the range of activities and responsibilities of the new commission. His major recommendations regarding the basic utility services, are summarized as follows.

(1) "...that the Commission acquire and operate all water transmission systems. The following water users are included: St. Albert, Morinville, Strathcona-Leduc, Parkland, Northeast, and the Vegreville Corridor Water Board.

(2) ...that the Commission acquire and operate the regional sewage treatment plant, and that the Commission also acquire and operate the St. Albert sewage transmission line and sewage lagoons.

(3) ...that the Commission should become involved in storm sewage management only when requested to do so by a member municipality...

(4) ...for the present, solid waste management should not be taken over by the Commission as a general policy. However, the Commission should be prepared, in its judgement, to direct and if necessary undertake studies and work required to remedy any situation not capable of a local solution.

(5) ...that there be a single Edmonton Regional Municipal Services Commission, with standing committees to deal with water, sanitary sewerage, storm sewerage, and solid waste management."[4]

Two special situations were acknowledged: that St. Albert's water supply arrangements and the Hamlet of Sherwood Park's present arrangements for water and sewerage continue until some more mutually beneficial system is justified in the future.

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[4] G. Hamilton, Notes on the Proposed Edmonton Regional Municipal Services Commission, Preliminary Discussion Report, April 1982.

7. REGIONAL PLANNING ISSUES

7.1 Introduction

Several important themes have been discussed in the preceding discussion on municipal utilities. The discussion of these themes provides a focus for subsequent policy formulation and decision making.

7.2 Servicing Capacities

A municipality's ability to provide sufficient water capacity, sewage treatment and solid waste disposal facilities is a good indication of its ability to accept additional population growth. The findings from the municipal servicing update indicate the following trends.

(1) There appears to be sufficient water supply and capacity for all communities at the present time.

(2) Most of the larger communities have built additional capacities for water supply into their systems.

(3) Satisfactory sewage treatment is available (as determined by the Department of Environment) for all communities at the present time.

(4) Future growth and expansion by St. Albert, Spruce Grove, Stony Plain, Fort Saskatchewan, Sherwood Park, and Gibbons is tied in with development of the new regional sewage treatment plant, proposed for operation in 1986. Sewage treatment for these municipalities is at or near capacity.

(5) The smaller municipalities, with their own independent water and sewage treatment systems, are continuing to improve and upgrade their individual systems to accommodate modest growth. The Towns of Bon Accord and Devon will continue to supply their own water and sewage treatment facilities. The Towns of Legal, Redwater, Bon Accord and the Village of New Sarepta will continue to operate their own independent smaller sewage treatment operations.

In summary, the majority of urban municipalities in the region have a high capacity for growth on the basis of water supply and sewage system capacity. Those municipalities that are linked with Regional trunklines and central treatment facilities have an even larger capacity for growth in the future.

7.3 Solid Waste Management

The Clover Bar sanitary landfill site will be at capacity by 1986, and a new site needs to be established in the near future. Attempts to locate the new facility close to the original site and outside of City's boundaries have been unsuccessful to date.

Perhaps the most serious problem in acquiring landfill sites is to obtain the acceptance and support of the community at large. Sites appropriate from an engineering and regulatory point of view can be rejected because of public resistance. Public information and discussion are essential to the development of an appropriate design, location and operating features for regional scale solid waste disposal sites. The new facility will likely have additional capacity to handle wastes from other regional areas.

7.4 Implementation of Regional Transmission System

The regional transmission system is based on a pair of pipeline systems, one carrying water outward, the other returning sewage to a central treatment plant. The nature and orientation of regional servicing have been established by the Department of Environment, through their Edmonton Regional Utilities Study in 1978.

The regionalization of water and sewer trunklines and facilities is primarily in place, through design and/or financial obligations. Final implementation and construction are dependent upon growth rates and continued government funding. The assurance of ample supply, consistent treatment and quality of water and sewage treatment will provide for all future growth requirements of participating municipalities.

Regional plan policy will have to recognize this situation and provide appropriate supportive land use policies which reinforce the regionalization of municipal utilities.

7.5 Edmonton Regional Municipal Services Commission

The Regional Municipal Services Act, Chapter 4-9-1, 1981 provides the first step in establishing the Edmonton Regional Municipal Services Commission. The Commission has the potential to play a role in the final development and operation of a regionally based utility system.

Since the Act was proclaimed in December 1981, there has been noticeable lack of public action to establish the Commission, its membership, responsibilities and its subsequent operation by the Provincial government.

Mr. Hamilton, a consultant to the Minister of Municipal Affairs submitted his final report and recommendations on the Edmonton Regional Municipal Services Commission in July 1982. Since that time, provincial funding for municipal utilities has been split between the Departments of Environment and Utilities and Telecommunication. The Department of Municipal Affairs has been examining municipal financial arrangements respecting utility services.

Many unanswered questions respecting the proposed Commission remain: the date of commencement, finalization of membership, the City of Edmonton's future role in the Commission, organization structure and the management of the existing servicing debt loads by municipalities are still unknown.

APPENDIX 1

DEFINITIONS

DEFINITIONS

AEROBIC LAGOON -
an oxygen-containing lagoon, often equipped with mechanical aerators, in which waste water is partially stabilized by the metabolic activities of bacteria and algae.

ANAEROBIC LAGOON -
a waste water or sludge treatment process that involves retention under anoxic conditions.

B.O.D. -
abbreviation for biochemical oxygen demand.

COMBINED SEWER -
a sewer intended to receive both waste water and storm or surface water.

COMPLETE TREATMENT-
in an imprecise and general sense, the process of domestic and some industrial waste waters by means of primary and secondary treatment. It may include other specialized types of treatment and disinfution. A high percentage removal of suspended, colloidal, and dissolved organic matter is implied.

E.R.U.S. -
the Edmonton Regional Utility Study 1978 completed by Alberta Environment. The report provided a comprehensive assessment of water and sewer requirements in the Regional Planning Region.

FLOCCULANTS -
water-soluble organic polyelectrolytes that are used alone or in conjunction with inorganic coagulants, such as aluminum or iron salts, to agglomerate solids present in water or waste water to form large, dense floc particles which settle rapidly.

LAGOON -
any large holding or detention pond, usually with earthen dikes, used to contain waste water while sedimentation and biological oxidation occur. See also anaerobic lagoon.

LAND DISPOSAL SITES -
these are land disposal sites for disposition of a wide variety of waste, various operational types as defined by Provincial Board of Health Regulations. Included would be: open dumps, modified landfills, dry dumps, and sanitary landfills.

MAIN SEWER -

(1) In larger systems, the principal sewer to which branch sewers and submains are tributary; also called trunk sewer. In small systems, a sewer to which one or more branch sewers are tributary.

(2) In plumbing, the public sewer to which the house or building sewer is connected.

MODIFIED LANDFILLS -
refuse is deposited in a trench. Regularly compacted and covered.

MUNICIPAL WASTE -

(1) the untreated waste water entering a municipal treatment facility.

(2) Generally, liquid and solid waste originating from a mixture of domestic (household) commercial, and industrial sources. See also industrial waste, sanitary sewage.

OPEN DUMPS -
rarely compacted and covered.

PRIMARY TREATMENT -

(1) The first major treatment in a waste water treatment facility, usually sedimentation but not biological oxidation.

(2) The removal of a substantial amount of suspended matter but little or no colloidal and dissolved matter.

(3) Waste water treatment processes usually consisting of clarification with or without chemical treatment to accomplish solid-liquid separation. See also secondary treatment.

RAW WATER -

(1) Untreated water; usually the water entering the first treatment unit of a water treatment plant.

(2) Water used as a source of water supply taken from a natural or impounded body of water, such as a stream, lake, pond, or underground aquifer.

R.B.C. -
Rotating Biological Contractor.

REGIONAL TRANSMISSION SYSTEM -
the concept of a pair of pipeline systems, one carrying water outward; the other returning sewage to a central treatment plant.

REGIONAL WASTE MANAGEMENT SYSTEM-
transfer stations are used for temporary storage of waste before it is hauled to a regional sanitary landfill.

RESERVOIR -
a pond, lake, tank, basin or other space, either natural or created in whole or in part by the building of engineering structures, which is used for storage, regulation, and control of water recreation, power, flood control or drinking. Sometimes called impoundment.

RETENTION PONDS -
basins, usually enclosed by artificial dikes, that are utilized for waste water treatment and/or storage.

SANITARY COLLECTION SYSTEM -
the sewer network used for the collection and conveyance of municipal waste water.

SANITARY LANDFILL -
a solid waste burial site operated to minimize environmental hazards. The wastes are continuously compacted and are covered daily with a layer of soil to minimize blowing, odors, fire hazards, and fly and rat problems; provisions are also made to minimize leaching of dissolved solids to groundwater.

SANITARY SEWAGE -
home waste water that contains human wastes; the major fraction of municipal waste water. See also sewage, stormwater.

SANITARY SEWER -
a sewer that carries liquid and waterborne wastes from residences, commercial buildings, industrial plants, and institutions, together with minor quantities of ground, storm, and surface waters that are not admitted intentionally. See also waste water.

SANITARY WASTE WATER -
(1) Domestic waste water with storm and surface water excluded.

(2) Waste water discharging from the sanitary conveniences of dwellings (including apartment houses and hotels), office buildings, industrial plants, or institutions.

(3) The water supply of a community after it has been used and discharged into a sewer.

SECONDARY TREATMENT -
(1) Generally, a level of treatment that produces removal efficiencies for B.O.D. and S.S. of 85%.

(2) Sometimes used interchangeably with concept of biological waste water treatment, particularly the activated sludge process. Commonly applied to treatment that consists chiefly of clarification followed by a biological process, with separate sludge collection and handling.

SEWAGE -
household and commercial waste water that contains human waste. Distinguished from industrial waste water. See also waste water.

SEWAGE TREATMENT PLANT (STP) -
the central facility of waste water treatment facilities which contains all treatment processes exclusive of the collection systems.

SEWAGE WORKS -
all-inclusive term of waste water collection. Dumping, treatment and disposal facilities. Term declining in use. See also sewer system, waste water facilities.

SEWER -
a pipe or conduit that carries waste water or drainage water.

SEWERAGE -
a complete system of piping, pumps, basins, tanks, unit processes, and appurtenances for the collection, transporting, treating and discharging of waste water. Term is declining in use. See also sewer system, waste water facilities.

SOLID WASTE -
discarded material, such as garbage, refuse, sludge and scrap, that is most commonly landfilled, but may be incinerated or recycled.

STORM SEWER -
a sewer that carries stormwater and surface water, street wash and other wash waters or drainage, but excluding domestic waste water and industrial wastes.

TRUNK MAIN -
a large pipe serving as a supply main or feeder main in a water distribution system.

TRUNK SEWER -
a sewer that receives many tributary branches and serves a large territory.

WASTE WATER -
the spent or used water of a community or industry which contains dissolved or suspended matter.

WASTE WATER FACILITIES -
the structures, equipment and processes required to collect, convey and treat domestic and industrial wastes and dispose of the effluent and sludge.

WATER SYSTEM -
collectively, all of the property involved in the operation of a water utility including land, water lines and appurtenances, pumping stations, treatment plant and general property.

APPENDIX 2

INVENTORY OF WASTE DISPOSAL SITES

Notes for Appendix 2

Source: Alberta Environment. Identification and Verification of Active and Inactive Land Disposal Sites in Alberta. Main Report. Edmonton. Alberta Environment, October 1982.

Location - The legal description of the site location.

Health Unit - The health unit within which the site is located.

Owner - The owner's name is recorded. If the owner is not known, "-" is recorded.

Status - "A" means the site is active.
"I" means the site is inactive.

Size - The area of the site in acres. If the area of the site is not known, "-" is recorded.

Priority - The priority of the site is ranked on a scale of Ranking 1 to 3 based on the scoring system. The scoring system is designed to evaluate standard criteria characteristics.

Priority 1	100 points or more
Priority 2	75-99 points
Priority 3	less than 75 points

The scoring system emphasizes problems related to surface and groundwater contamination and proximity to human habitation.

Priority 1 sites are potential problem sites, however, further research is required to determine the extent of the problem or whether a problem does exist.

Other Abbreviations

CO -	county
LT -	less than
Sv -	summer village
Trans -	transfer station
T -	town
Unapp. Site -	unapproved site
V -	village

APPENDIX 2

SUMMARY OF ACTIVE AND INACTIVE WASTE DISPOSAL SITES IN THE E.M.R.P.C.

CITY OF EDMONTON

Name	Site No.	Location (Sec, Twp, Rge, M)	Health Unit	Owner	Status (A=Active) (I=Inactive)	Size (Acre)	Priority Ranking
Beverly	EDM/010	NW07&SW18-53-23-W4	City of Edmonton	Edmonton Sanitation	I	70	3
Frontier Farms	EDM/020	NE06&SE07-53-23-W4	City of Edmonton	Edmonton Sanitation	I	166	1
Golden W. Drive-In	EDM/023	W of Drive-in, 118 Ave.	City of Edmonton	-	A		3
Gold Ravine	EDM/024	Groat Road & 107 Ave.	City of Edmonton	Edmonton Sanitation	I	-	3
Hind Golf Course	EDM/025	E on 82 St., N. River Bk.	City of Edmonton	Edmonton Sanitation	I	-	3
Millwoods	EDM/030	NW11&SW14-52-24-W4	City of Edmonton	Edmonton Sanitation	I	95	3
Rat Creek Ravine	EDM/035	112 Ave. & 88 St.	City of Edmonton	Edmonton Sanitation	I	-	3
Coronation (Trans)	EDM/050	11424 - 143 Street	City of Edmonton	Edmonton Sanitation	A	2	3
Kennedale (Trans)	EDM/060	12804 - 48 Street	City of Edmonton	Edmonton Sanitation	A	5	3
Strathcona (Trans)	EDM/070	5140 - 99 Street	City of Edmonton	Edmonton Sanitation	A	2	3
-	EDM/085	99 St. & 58 Ave.	City of Edmonton	Edmonton Sanitation	I	-	3

COUNTY 31 - PARKLAND

BACM Industries	C031/010	N15-53-25-W4	Sty. Pin. - Lac Ste. Anne	Genstar Ltd.	A	20	1
Cyntnia	C031/020	LSD 0708-50-10-W5	Alta. West Central	Stony Plain	A	5	3
Cynthia	C031/030	SE08-50-10-W5	Alta. West Central	C031	A	2	3
Drayton Valley	C031/040	SE20-49-07-W5	Alta. West Central	Drayton Valley (T)	A	35	1
Easyford	C031/050	LSD 1334-49-08-W5	Alta. West Central	C031	A	40	3
Edmonton Beach	C031/060	SE30-52-01-W5	Sty. Pin. - Lac Ste. Anne	C031	I	-	3
Edmonton Beach	C031/065	NW29-52-01-W5	Sty. Pin. - Lac Ste. Anne	-	I	-	2
Entwistle	C031/070	SE21-53-07-W5	Sty. Pin. - Lac Ste. Anne	Entwistle (V)	I	2	2
Falls	C031/080	SW14-53-05-W5	Sty. Pin. - Lac Ste. Anne	C031	A	2	3
Highvale	C031/090	SW03-52-04-W5	Sty. Pin. - Lac Ste. Anne	C031	A	2	3
Kapasiwin	C031/095	SE19-53-03-W5	Sty. Pin. - Lac Ste. Anne	C031	A	-	3
Keephills	C031/100	NW16-51-03-W5	Sty. Pin. - Lac Ste. Anne	C031	A	5	2
Lake Edan	C031/105	NE13-53-02-W5	Sty. Pin. - Lac Ste. Anne	-	A	-	3
Lodgepole	C031/110	LSD 0436-47-10-W5	Alta. West Central	C031	A	40	3
Rocky Rapids	C031/120	NE34-49-07-W5	Alta. West Central	C031	A	2	3
Seba Beach	C031/130	NE11-53-06-W5	Sty. Pin. - Lac Ste. Anne	C031	A	10	3
Spruce Grove	C031/140	SE34-52-27-W4	Sty. Pin. - Lac Ste. Anne	Spruce Grove (T)	I	3	2

continued...

SUMMARY OF ACTIVE AND INACTIVE WASTE DISPOSAL SITES IN THE E.M.R.P.C.

COUNTY 31 - PARKLAND, continued

Name	Site No.	Location (Sec, Twp, Rge, M)	Health Unit	Owner	Status (A=Active) (I=Inactive)	Size (Acre)	Priority Ranking
Spruce Grove	C031/150	SE34-52-27-W4	Sty. Pln. - Lac Ste. Anne	Spruce Grove (T)	A	-	2
Stony Plain	C031/160	Lot C, Pl. 570MC SE35-52-01-W5	Sty. Pln. - Lac Ste. Anne	Stony Plain (T) MD 84	A	90	1
Tomahawk	C031/170	SW12-51-06-W5	Sty. Pln. - Lac Ste. Anne	C031	A	16	2
Violet Grove	C031/180	SW24-48-08-W5	Alta. West Central	C031	A	4	3
Wabamun	C031/190	SW35-52-03-W5	Sty. Pln. - Lac Ste. Anne	C031	I	1	3
Wabamun	C031/200	SW16-53-04-W5	Sty. Pln. - Lac Ste. Anne	Calgary Power Ltd.	A	-	3
Wabamun	C031/210	Pt NW12-53-04-W5	Sty. Pln. - Lac Ste. Anne	-	I	-	3
			COUNTY 25 - LEDUC				
Beaumont	C025/010	SW26-50-24-W4	Leduc-Strathcona	Leduc (Co)	I	3	2
Breton	C025/020	SE35-47-04-W5	Leduc-Strathcona	Breton (V)	A	9	2
Buck Creek (New)	C025/030	SE36-47-07-W5	Leduc-Strathcona	Leduc (Co)	A	4	3
Buck Creek (Old)	C025/040	LSD8 SE22-47-07-W5	Leduc-Strathcona	Great Plain Dev. of Canada Ltd.	A	3	3
Buck Creek	C025/045	SE22-47-06-W5	Leduc-Strathcona	Great Plain Dev. of Canada Ltd.	A	-	3
Calmar	C025/050	NE25-49-27-W4	Leduc-Strathcona	Calmar (T)	I	2	1
Devon	C025/055	NE34-50-26-W4	Leduc-Strathcona	Imperial Oil	I	-	3
Genesee	C025/060	SW07-51-02-W5	Leduc-Strathcona	St. John's School	A	3	3
Golden Days (Sandhoim)	C025/070	NE15-47-01-W5	Leduc-Strathcona	Leduc (Co)	I	6	3
Kavanagh	C025/080	NE36-48-25-W4	Leduc-Strathcona	Leduc (Co)	I	4	3
Leduc	C025/090	NE23-49-25-W4	Leduc-Strathcona	Leduc (T)	I	20	3
Leduc Regional Sanitary Landfill (New)	C025/100	NE29-49-24-W4	Leduc-Strathcona	L.D.R.W.M.A.	A	160	3
Leduc Regional Sanitary Landfill (Old)	C025/110	NE10-50-26-W4	Leduc-Strathcona	Leduc (Co)	I	10	1
Lindale (New)	C025/120	NW26-49-05-W5	Leduc-Strathcona	Leduc (Co)	A	16	3
Lindale (Old)	C025/130	SE22-49-05-W5	Leduc-Strathcona	Leduc (Co)	I	5	2
Looma	C025/140	NW36-50-23-W5	Leduc-Strathcona	Leduc (Co)	A	2	3
Mission Beach	C025/150	NW29-47-01-W5	Leduc-Strathcona	Leduc (Co)	A	6	3

continued...

SUMMARY OF ACTIVE AND INACTIVE WASTE DISPOSAL SITES IN THE E.N.R.P.C.
COUNTY 25 - LEDUC, continued

Name	Site No.	Location (Sec, Twp, Rge, M)	Health Unit	Owner	Status (A=Active) (I=Inactive)	Size (Acre)	Priority Ranking
New Sarepta	C025/160	NE34-49-22-W4	Leduc-Strathcona	Leduc (Co)	A	-	2
New Sarepta	C025/170	NW34-49-22-W4	Leduc-Strathcona	Leduc (Co)	A	6	1
Rolly View	C025/180	NE22-49-23-W4	Leduc-Strathcona	Leduc (Co)	A	2	3
Rolly View (Old)	C025/190	SE29-49-23-W4	Leduc-Strathcona	Leduc (Co)	I	1	3
Roman Lichon	C025/195	23-47-01-W5	Leduc-Strathcona	Roman Lichon	A	30	2
Sunnybrook	C025/210	NW11-49-02-W5	Leduc-Strathcona	Leduc (Co)	A	2	3
Sunnybrook	C025/215	SW11-49-02-W5	Leduc-Strathcona	Leduc (Co)	I	-	3
Thorsby	C025/220	SE27-49-28-W4	Leduc-Strathcona	Leduc (Co)	A	2	3
Warburg	C025/240	NE26-48-03-W5	Leduc-Strathcona	Warburg (V)	A	7	1
Wizard Lake	C025/250	NE02-48-27-W4	Leduc-Strathcona	Leduc (Co)	A	-	3
-	C025/260	NE of SE13-50-27-W4	Leduc-Strathcona	-	A	-	3
-	C025/270	SE27-50-26-W4	Leduc-Strathcona	-	A	-	3
Zeiner Park	C025/280	SW24-47-02-W5	Leduc-Strathcona	Leduc (Co)	A	2	3
			MUNICIPAL DISTRICT #90 - STURGEON				
Apex Gravel Pit	MD90/010	SW34-53-23-W4	Sturgeon	Mix Bros. Serv.	I	-	3
Bon Accord	MD90/020	SW06-56-23-W4	Sturgeon	MD90	I	3	2
Bon Accord	MD90/021	NW31-55-23-W4	Sturgeon	Double "L" Disp. Ltd.	I	-	3
CFB Edmonton	MD90/025	NW16-54-24-W4	Sturgeon	Dept. Nat. Defense	I	LT 1	2
CFB Edmonton	MD90/026	SW15-54-24-W4	Sturgeon	Dept. Nat. Defense	I	LT 1	3
Cardiff	MD90/030	NW13-55-25-W4	Sturgeon	MD90	I	5	3
Cardiff	MD90/040	NW & SW24-55-25-W4	Sturgeon	MD90	I	5	1
Double "L"	MD90/050	SW & SE05-56-23-W4	Sturgeon	Double "L" Disp. Ltd.	I	5	1
Double "L"	MD90/051	NW14-55-24-W4	Sturgeon	Double "L" Disp. Ltd.	I	-	3
Gibbons	MD90/060	NW & NE14-56-23-W4 Parcel A, Pl. 5834 NW	Sturgeon	Gibbons (V) (North. Alfalfa Prod.)	I	5	1
Gibbons	MD90/061	NE21-55-22-W4	Sturgeon	-	I	-	3
Hood Enterprises	MD90/070	SE28-53-25-W4	Sturgeon	Hood Enterprises	A	40	3
Legal	MD90/080	NE23-57-25-W4	Sturgeon	-	I	3	3
Legal	MD90/100	NW25-57-25-W4	Sturgeon	Legal (V)	A	1	3

continued...

SUMMARY OF ACTIVE AND INACTIVE WASTE DISPOSAL SITES IN THE E.M.R.P.C.

MUNICIPAL DISTRICT #90 - STURGEON, continued

Name	Site No.	Location (Sec, Twp, Rge, M)	Health Unit	Owner	Status (A=Active) (I=Inactive)	Size (Acre)	Priority Ranking
Redwater	MD90/120	SW32-57-21-W4	Sturgeon	Redwater (T)	I	8	3
St. Albert	MD90/128	SW28-53-24-W4	Sturgeon	Alta. ENR	I	-	3
St. Albert Dry Disp.	MD90/127	River Lot 53, St. Albert Settlement	Sturgeon	St. Albert (C)	A	70	2
Sturgeon Regional	MD90/130	SW36-55-25-W4	Sturgeon	MD90	A	120	2
			COUNTY 20 - STRATHCONA				
Ardrossan	C020/010	SE05-53-21-W4	Leduc-Strathcona	Strathcona (Co)	A	160	1
Bruderheim (Old)	C020/015	NW18-56-20-W4	Vegreville	Bruderheim (V)	I	-	2
Chevron Standard Ltd.	C020/017	32-54-22-W4	Vegreville	Chevron Standard	A	-	3
Clover Bar Regional	C020/019	NW21 & S28-53-23-W4	City of Edmonton	Edmonton (C)	A	50	1
Cooking Lake	C020/020	SW06-52-20-W4	Leduc-Strathcona	Strathcona (Co)	I	10	3
Dow Chemical (Gen.)	C020/030	Blk. 100-Ft. Sask.	Leduc-Strathcona	Dow Chemical	A	-	3
Dow Chemical-Secured	C020/040	Blk. 100-Ft. Sask.	Leduc-Strathcona	Dow Chemical	A	-	3
East Side Disposal	C020/050	NW08-53-23-W4	Leduc-Strathcona	East Side Disp. Ltd.	I	3	3
Frontier Farms	C020/055	SE07-53-23-W4	Leduc-Strathcona	Dept. of Public Works	I	5	3
Fort Sask. (New)	C020/060	SW33-54-22-W4	Leduc-Strathcona	Fort Saskatchewan (T)	A	-	3
Fort Sask. (Old)	C020/070	NE24-54-23-W4	Leduc-Strathcona	Fort Saskatchewan (T)	I	6	3
Gem Sod Farms Ltd.	C020/075	Fort Saskatchewan	Leduc-Strathcona	Gem Sod Farms	A	-	3
Josephburg	C020/080	NE05-55-21-W4	Leduc-Strathcona	Strathcona (Co)	A	3	2
Josephburg (Trans)	C020/090	NW05-55-21-W4	Leduc-Strathcona	Strathcona (Co)	A	5	3
Sherritt Gordon Mines	C020/110	Fort Saskatchewan	Leduc-Strathcona	Sherritt Gordon Mines	A	-	3
Sherwood Park	C020/120	NE15-52-23-W4	Leduc-Strathcona	Strathcona (Co)	I	50	2
Sherwood Park	C020/123	01-52-23-W4	Leduc-Strathcona	-	A	-	3
-	C020/030	06-53-23-W4	Leduc-Strathcona	-	A	-	3

* The waste disposal sites noted are identified in Figure 3 in the main text.

APPENDIX 3

BIBLIOGRAPHY

APPENDIX 3 - BIBLIOGRAPHY

Alberta Department of Municipal Affairs. Municipal Services Branch. Alberta Municipal Assistance Programs 1983. Edmonton. Department of Municipal Affairs, August 1983.

Municipal Services in the County of Strathcona No. 20. The Main Report. Edmonton. Department of Municipal Affairs, July 1983.

Alberta Environment. Edmonton Regional Utilities Study. Vol. 1. Main Report. Edmonton. Alberta Environment, July 1978.

Identification and Verification of Active and Inactive Land Disposal Sites in Alberta. Main Report. Edmonton. Alberta Environment. October 1982.

Alberta Provincial Board of Health. Design and Operating Standards for Sanitary Landfills. Edmonton. Provincial Board of Health. November 6, 1971.

Alberta Provincial Board of Health. Division 12. Regulations Respecting the Control of Refuse Disposal Systems. Amended April 1972.

Associated Engineering Services Ltd. Development Constraints Study, Urban Growth Strategy. Edmonton. City of Edmonton Planning Department. Planning and Development Division, December 1981.

Clean Air Act, The. 1971. c. 16; with amendments up to and including November 4, 1976.

Clean Water Act, The. 1971. c. 17; with amendments up to and including November 4, 1976.

Dillon, M.M. Regional Waste Heritage Study for the Town of Spruce Grove, Stony Plain and the County of Parkland. Draft Report. March 1982.

Edmonton Corporate Policy Planning Office. Local Policy Plan 1982-1986. Main Report. May 1981.

Edmonton Metropolitan Regional Planning Commission. The Status of Regional Servicing and Regional Services Commission. Edmonton. Edmonton Metropolitan Regional Planning Commission. January 1982.

Edmonton Regional Planning Commission. Alternative Organizational Structures for the Provision of Regional Services. Edmonton. Edmonton Regional Planning Commission. August 1981.

Examination of Possible Areas of Conflict Between the Edmonton Regional Utilities Study and the Draft Regional Plan. Edmonton. Edmonton Regional Planning Commission. June 1980.

Edmonton Regional Planning Commission. Municipal Servicing Updates, Inventory. Edmonton. Edmonton Regional Planning Commission. 1981.

Services to Property. Edmonton Regional Growth Studies Paper No. 7. Edmonton. Edmonton Regional Planning Commission. July 1976.

Ellis, M. and McClure, S. Presentation at the Regional Plan Committee, March 24, 1982.

Ellis, M. and Sutherland, D. Personal Interview. Alberta Environment. Municipal Engineering Branch. March - May, 1982 and September 1983.

Hamilton, G. Edmonton Regional Municipal Services Commission. Submitted to the Minister of Municipal Affairs, July 20, 1982.

Notes on the Proposed. Edmonton Regional Municipal Services Commission. Preliminary Discussion Report, March 1982.

Presentation at the E.M.R.P.C. Meeting, March 3, 1982.

Land Surface Conservation and Reclamation Act. RSA 1980. C L-3.

Oldman River Regional Planning Commission. Inter-municipal Services - Lethbridge Area - 4 Solid Waste Disposal. Lethbridge. Oldman River Planning Commission, May 1977.

Public Health Act. RSA 1972. C. 294 s. 7(L): with amendments up to and including June 10, 1979.

Red Deer Regional Planning Commission. Municipal Utilities Study. Red Deer. Red Deer Regional Planning Commission, October 1978.

Regional Municipal Services Act. 1981. C. R-9.1.

Stanley Associates Engineering Ltd. Study of Utilities and Services. St. Alberta. City of St. Albert. January 1980.

Strathcona Annexation Study of Utilities and Services, Edmonton - Sub-region. Edmonton. Stanley Associates Engineering Ltd., December 1979.

Transportation and Utility System Study. Stony Plain. Town of Stony Plain. November 1980.

Thierman and Associates. Town of Spruce Grove, Utilities and Roadway Review. September 1979.

Underwood McLellan Ltd. Clover Bar Sanitary Landfill Development Project. Edmonton. City of Edmonton. Water and Sanitation Department. March 1982.

Siting Study, Sanitary Landfill Development Project. Edmonton. City of Edmonton. Water and Sanitation Department. March 1982.

The City of Edmonton Annexation Project Utilities Study (water, sanitary sewage, solid wastes and storm drainage). June 1979.

Various General Municipal Plans prepared in the Region (review of the municipal utility sections).

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QUALITY

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